YAMAHA

EF1000
Service Manual

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FOREWORD

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha generator have a basic understanding of the mechanical precepts and procedures inherent to generator repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit for use and/or unsafe.

Yamaha Motor Company Ltd. is continually striving to further improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

NOTE:

This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.

EF1000
SERVICE MANUAL
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HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

⚠

The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

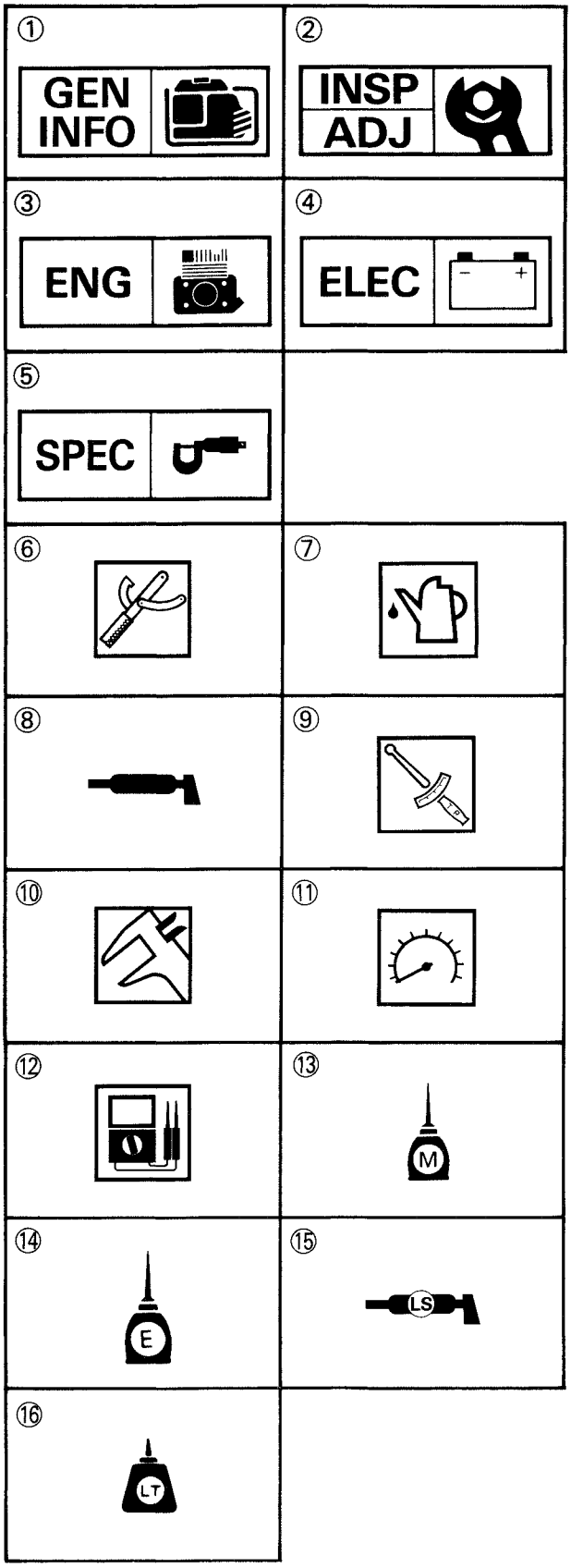
MANUAL FORMAT

The procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
  Pitting/Damage→Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑤ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Periodic inspection and adjustment
③ Engine
④ Electrical
⑤ Specifications

Illustrated symbols ⑥ to ⑫ are used to identify the specifications appearing.

⑥ Special tool
⑦ Filling fluid
⑧ Lubricant
⑨ Tightening
⑩ Wear limit, clearance
⑪ Engine speed
⑫ Ω, V, A

Illustrated symbols ⑬ to ⑯ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑬ Apply molybdenum disulfide oil
⑭ Apply engine oil
⑮ Apply lightweight lithium soap base grease
⑯ Apply locking agent (LOCTITE®)

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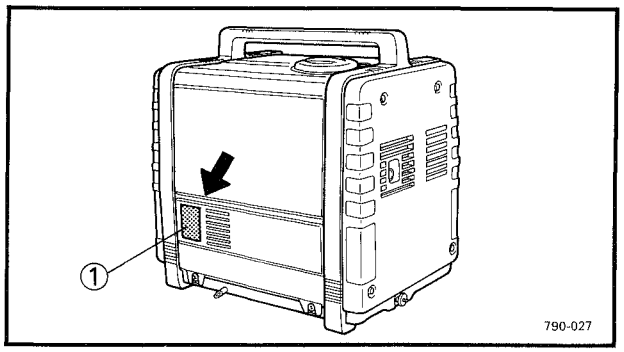


GENERAL INFORMATION

MACHINE IDENTIFICATION

ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the rear cover.

NOTE:

The first three digits of these numbers are for model identification; the remaining digits are the unit production number.

STARTING SERIAL NUMBER

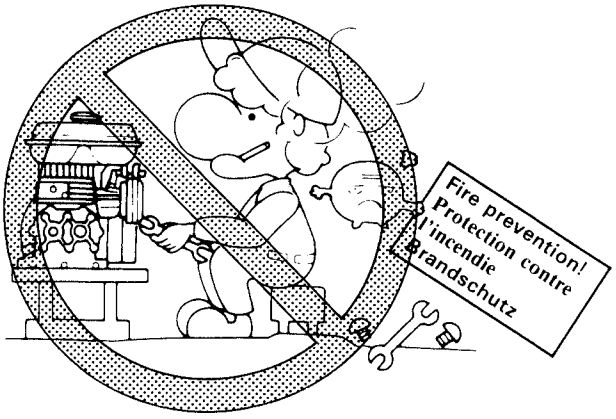
EF1000	**7FL**	**0400101~**

NOTE:

Designs and specifications are subject to change without notice.

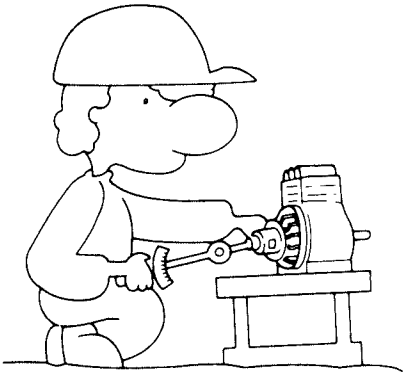
IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY



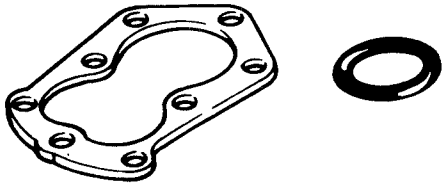
NOTES ON SERVICE

1. Fire prevention
   When servicing the engine, always keep away from fire.

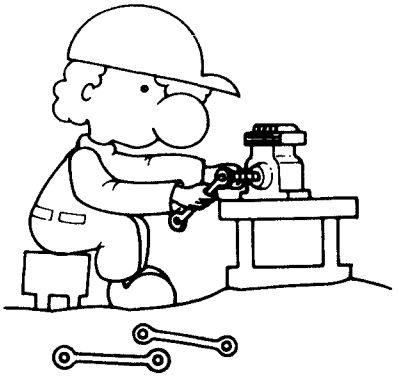


2. Right tools
   Be sure to use the right special tool for the job to guard against damage.

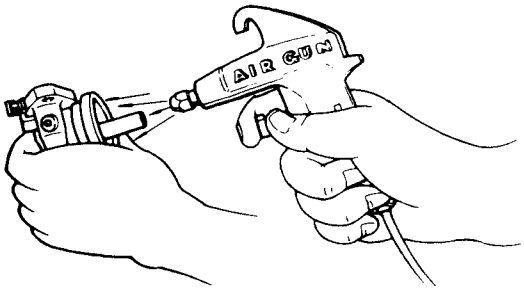
3. Oil, grease and sealers
   Be sure to use genuine Yamaha oils, greases and sealers, or the equivalents.



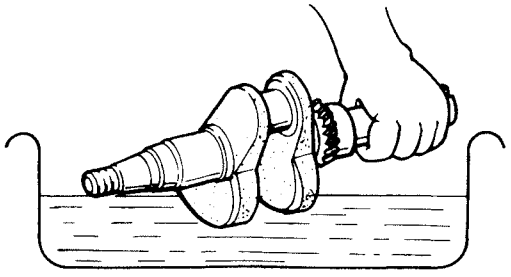
4. Expendable parts
   Always replace gaskets, O-rings, cotter pins, and circlips with new parts when servicing engine.



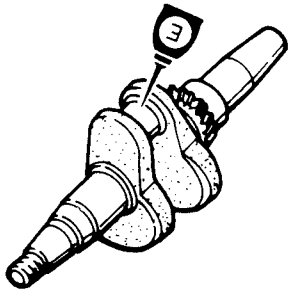
5. Tightening torque
   Be sure to follow torque specifications. When tightening bolts, nuts or screws, start with the largest-diameter one and work from an inner position to an outer position in a crisscross pattern.



6. Notes on disassembly and assembly
a. Parts should be cleaned in solvent and blown dry with compressed air after disassembly.



Solvent
Dissolvant
Lösungsmittel



b. Contact surfaces of moving parts should be oiled when reassembled.

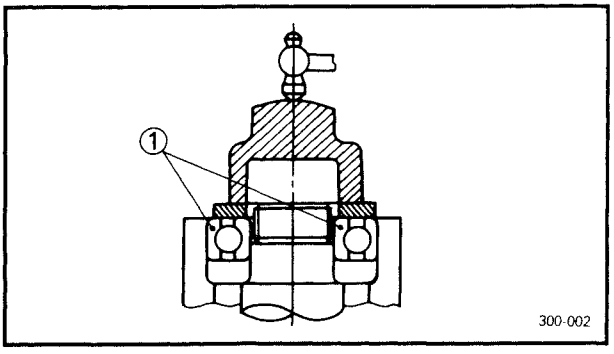
c. Make sure that parts move smoothly after each section of the machine is assembled.

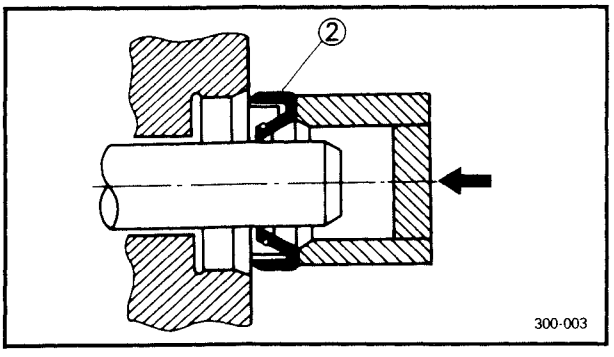
ALL REPLACEMENT PARTS

1. We recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.





BEARINGS AND OIL SEALS

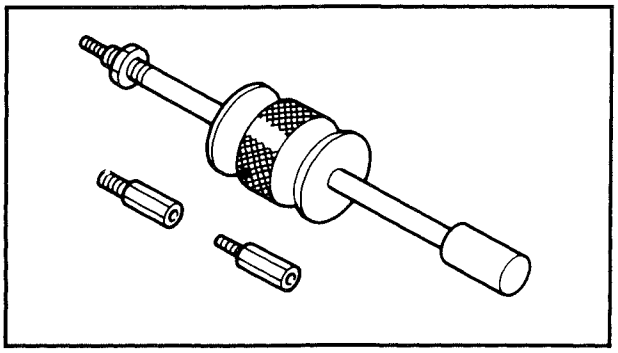
1. Install the bearing(s) ① and oil seal(s) ② with their manufacture's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.

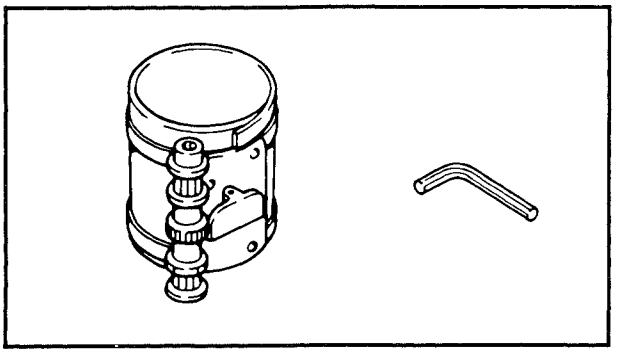
SPECIAL TOOLS AND TESTERS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



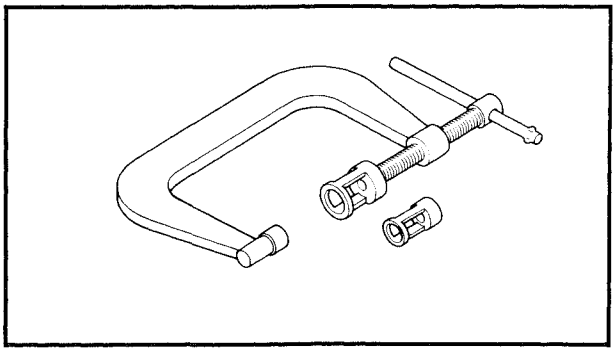
1. Rotor shock puller
   P/N. YU-1047 (90890-01259)
   Rotor puller attachment (M10 × 1.25)
   P/N. YU-1350 (90890-01349)

This tool is used to remove the rotor.



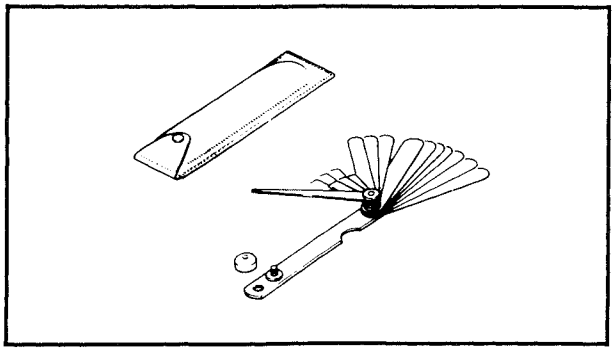
2. Piston ring compressor
   P/N. YU-33294 (90890-05158)

This tool is used to compress the piston rings when installing the piston.



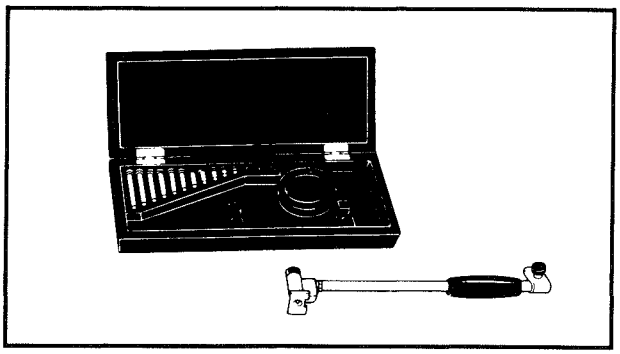
3. Valve spring compressor
   P/N. YM-01253 (90890-01253)

This tool is used to remove the valve spring.



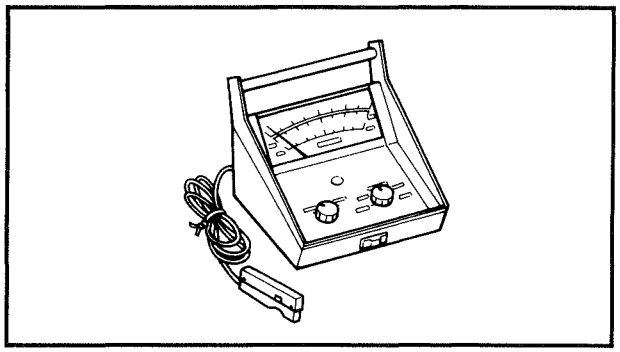
4. Service gauge (Thickness gauge)
   P/N. YU-26900-9 (90890-03079)

This gauge is used to adjust valve clearance, piston clearance and piston ring end gap.



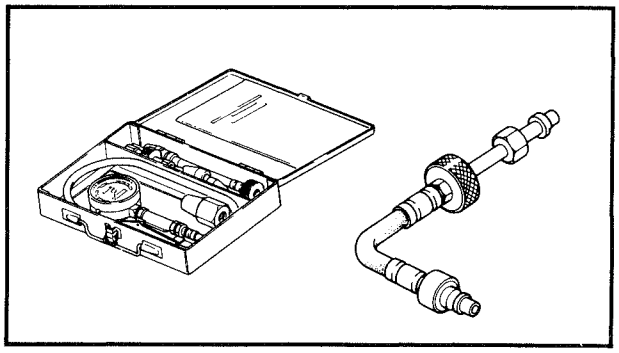
5. Cylinder gauge
   P/N. YU-03017 (90890-03017)

This instrument is used for checking cylinder bore size and condition.



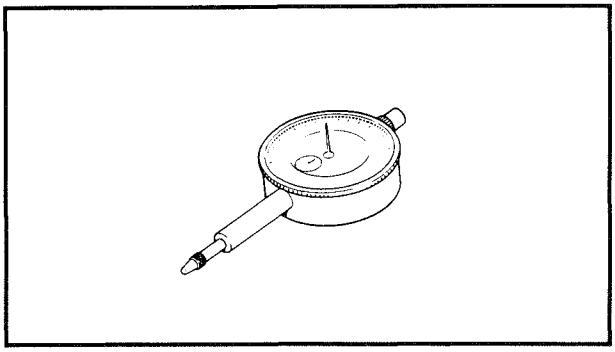
6. Inductive tachometer
   P/N. YU-8036-A

This instrument is used for reading engine rpm.



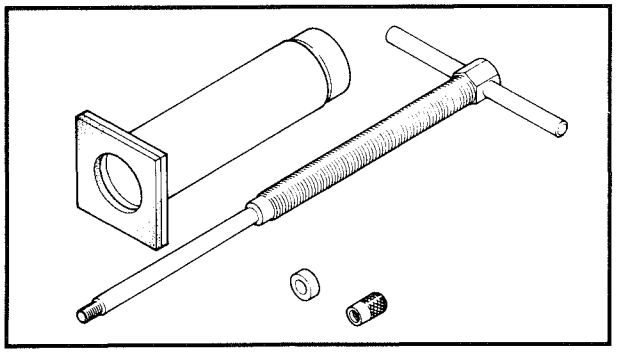
7. Compression gauge set
   P/N. YU-33223 (90890-03081)
   Adapter
   P/N. YU-33223-3 (90890-04082)

This gauge is for checking engine compression.



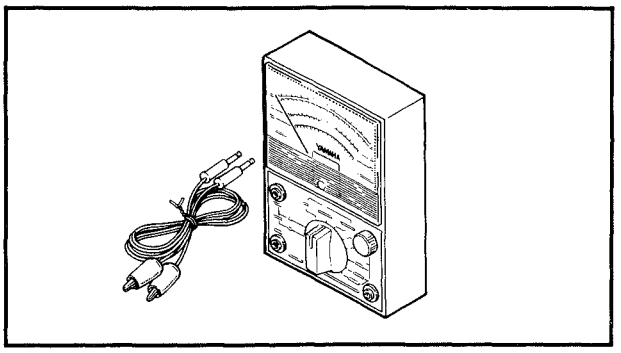
8. Dial gauge
   P/N. YU-03097 (90890-03097)

This instrument is used for checking crankshaft side clearance.



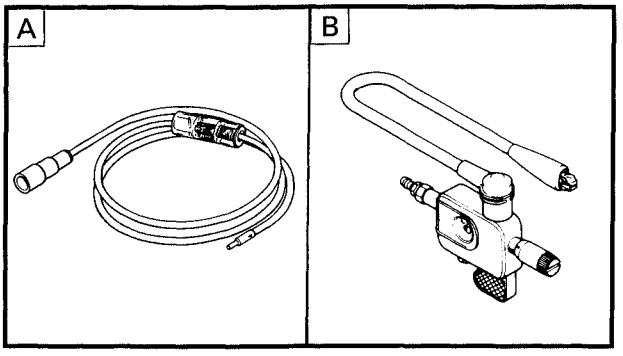
9. Piston pin puller
   P/N. YU-01304 (90890-01304)

This tool is used to remove the piston pin.



10. Pocket tester
    P/N. YU-03112 (90890-03112)

This instrument is necessary for checking the electrical system.



11. Dynamic spark tester [A]
    P/N. YM-34487
    Ignition checker [B]
    P/N. 90890-06754

This instrument is necessary for checking the ignition system components.

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

MAINTENANCE INTERVALS CHART

Proper periodic maintenance is important. Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following maintenance tables, the services related to emissions control are indicatedas "**" in the chart.

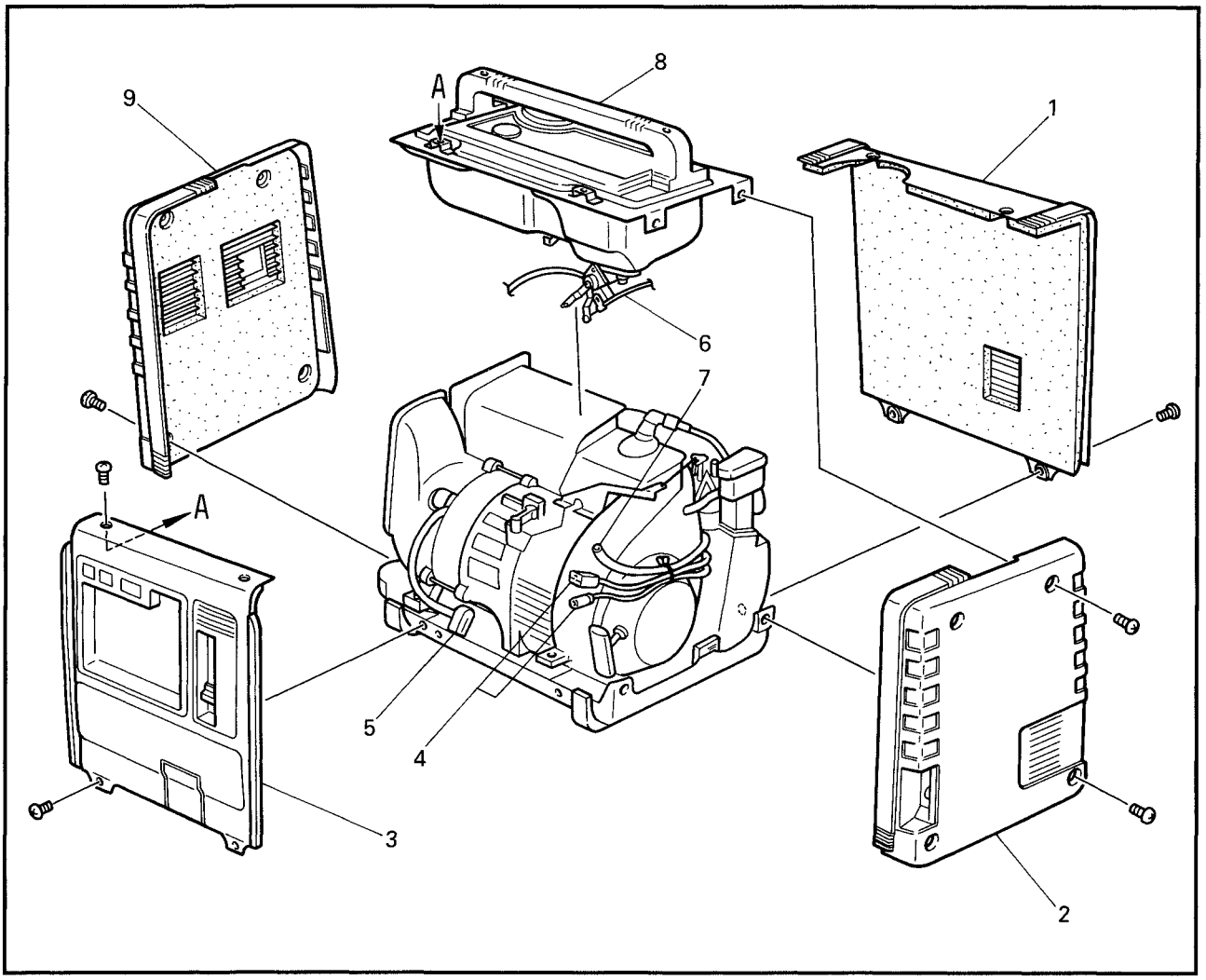
PERIODIC MAINTENANCE/LUBRICATION INTERVALS

No.	Item	Remarks	Pre-Operation check (daily)	Initial	Every		
				1 month or 20 Hr	3 months or 50 Hr	6 months or 100 Hr	12 months or 300 Hr
1.	** Spark Plug	Check condition adjust gap and clean. Replace if necessary.			●		
2.*	** Valve Clearance	Check and adjust when engine is cold.					●
3.*	** Crankcase breather system	Check breather hose for cracks or damage. Replace if necessary.					●
4.*	** Idle speed	Check and adjust engine idle speed.					●
5.	** Exhaust System	Check for leakage. *Retighten or replace gasket if necessary.	●				
		Check muffler screen and spark arrester. Clean/replace if necessary.					●
6.	Engine oil	Check oil level	●				
		Replace		●		●	
7.	** Air Filter	Clean. Replace if necessary.			●		
8..	Fuel Filter	Clean fuel tank filter. Replace if necessary.				●	
		*Check fuel cock filter. Replace if necessary.				●	
9.	Fuel Line	Check fuel hose for crack or damage. *Replace if necessary.	●				
10.	** Control lever	Check control lever (choke) operation.	●				
11.*	Control System	Check for fan damage.					●
12.	Starting System	Check recoil starter operation.	●				

No.	Item	Remarks	Pre-Operation check (daily)	Initial	Every		
				1 month or 20 Hr	3 months or 50 Hr	6 months or 100 Hr	12 months or 300 Hr
13.*	** Decarbonization	More frequently if necessary.					●
14.	Generation	Check the voltage meter and pilot light comes on.	●				
15.*	Fittings/ Fasteners	Check all fittings and fasteners. Correct if necessary.				●	

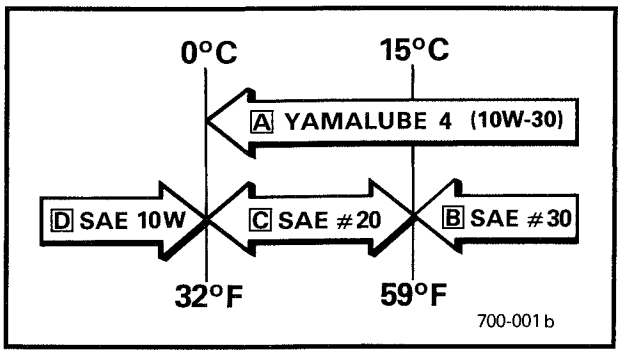
* : It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.
**: Related to emission control system.

BODY COVER/FUEL TANK



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of Body cover and Fuel tank		Remove the parts in order.
1	Rear cover	1	
2	Cover side 1	1	
3	Front cover	1	
4	Coupler/Engine stop lead	1	
5	Coupler	1	
6	Starter (Choke) wire	1	
7	Fuel hose/Fuel tank breather hose	1	**NOTE:** Turn the fuel cock lever to "OFF". **⚠WARNING** Always clean up spilled fuel immediatey.
8	Fuel tank	1	
9	Cover side 2	1	Reverse the removal procedure for installation.



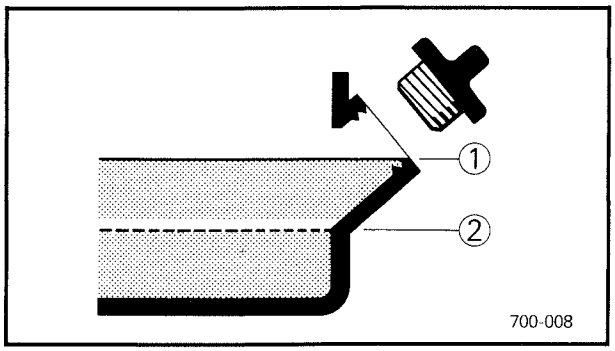
ENGINE

ENGINE OIL

Recommended oil:
A YAMALUBE 4-cycle oil or SAE 10W-30 type SE motor oil
B SAE #30
C SAE #20
D SAE #10
Engine oil quantity:
0.43 L (0.38 Imp qt, 0.45 US qt)

NOTE:

Recommended engine oil classifiaction:
API Service "SE" or "SF" if not available, "SD".

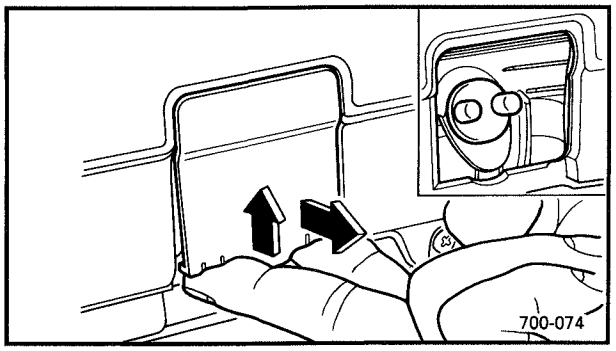


Oil Level Measurement

1. Check:
   - Oil level

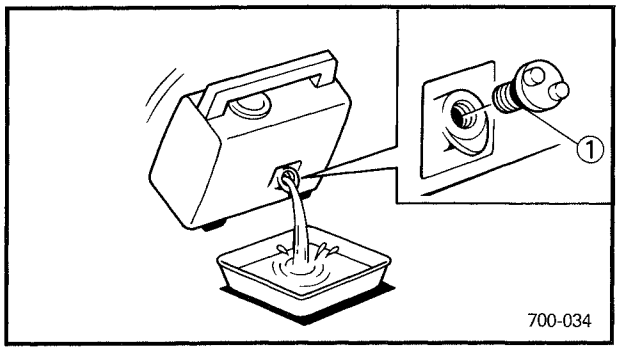
Oil level measurement steps:
- Place the engine on level ground.
- Warm up the engine for a few minutes.
- Stop the engine.
- Make sure the engine oil is between upper and lower levels. Add oil as necessary.

① Upper level
② Lower level

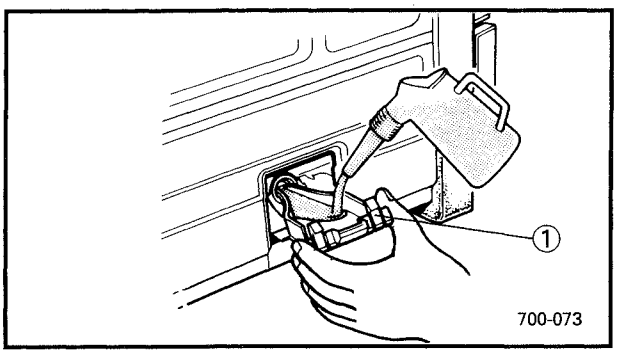


Oil Replacement

1. Warm up engine for several minutes.
2. Place a receptacle under the engine.
3. Remove:
   - Oil filler cover



4. Remove:
   •Oil filler cap ①
   Drain the engine oil.



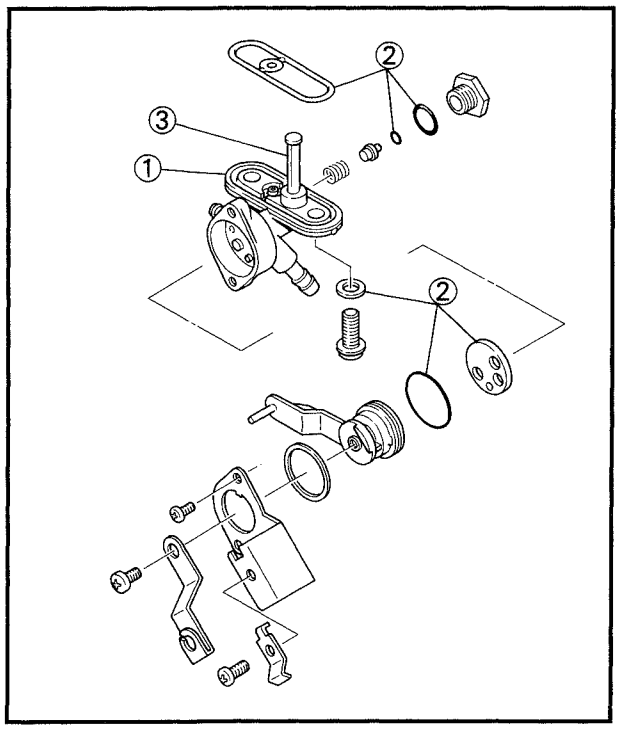
5. Fill:
   •Crankcase
   Use oil filler cover ①

Recommended engine oil:
0.43 L (0.38 Imp qt, 0.45 US qt)

CAUTION:

Do not allow foreign material to enter the crankcase.

6. Tighten:
   •Oil filler cap
7. Install:
   •Oil filler cover



FUEL COCK

Removal and Inspection

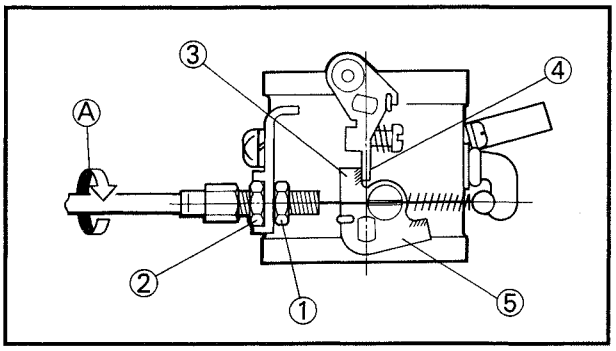
1. Remove:
   •Body panel
2. Drain the fuel tank and remove the fuel hose from the fuel cock.
3. Inspect:
   •Fuel cock body ①
   Contamination→Clean.
   •O-ring/Gasket ②
   Damage→Replace.
   •Strainer ③
   Contamipation→Clean.

NOTE:

Clean the body with solvent and wipe it off.

STARTER WIRE ADJUSTMENT

1. Remove:
   - Rear cover
   - Side cover 1

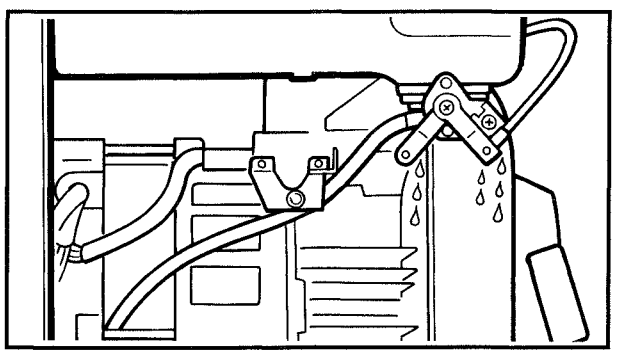


Adjustment steps:

a. Set the control lever to "ON".
b. Loosen the lock nut ① and nut ②.
c. Turn the nut ② clockwise Ⓐ until the open side of the lever ③ becomes free from the stopper ④.
d. Loosen the nut ② 1/2 turn counterclockwise and secure the locknut ①.
e. Set the control lever to the "|◥|" position.
f. Check whether the closed side of the lever ⑤ contacts the stopper ④.

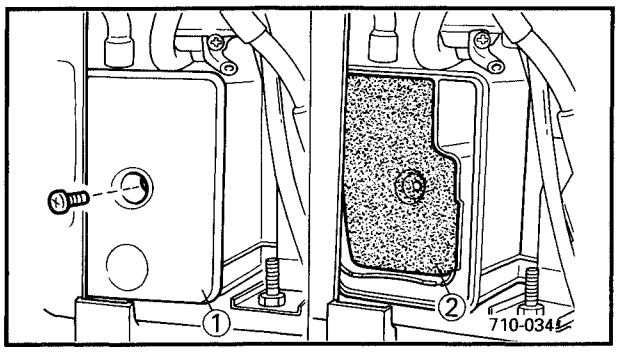
   Contacts the stopper→Correct.
   There is a gap between the lever ⑤ and stopper ④ →*
   *Loosen the nut ② another **1/2** turn counterclockwise and secure the lock nut ①.
g. Return to step "f".

2. Install:
   - Side cover 1
   - Rear cover



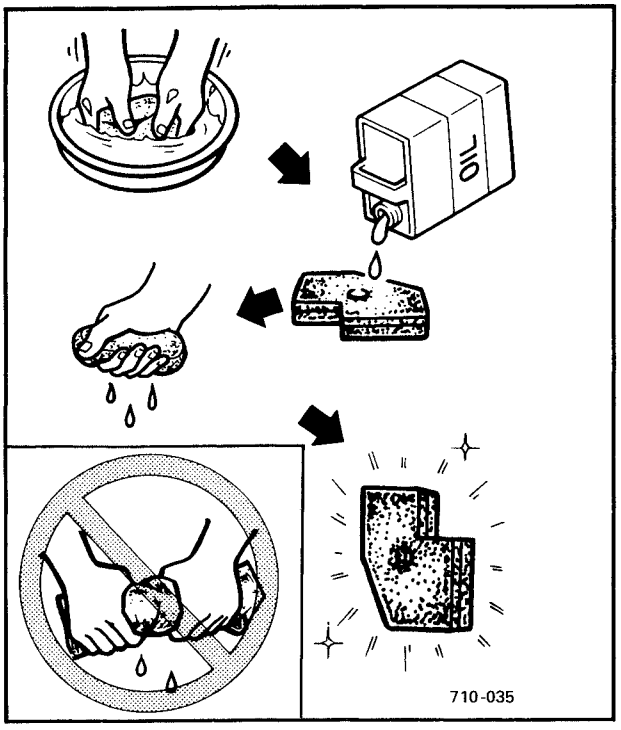
FUEL LINE

1. Inspect:
   - Fuel hose
     Clacks/Damage→Replace
     Poor connection→Correct



AIR FILTER

1. Remove:
   - Rear cover
   - Air filter cover ①
   - Air filter element ②



2. Inspect:
   - Element

   Clogging → Wash the element in solvent and dry.
   Oil the element and squeeze out excess oil.
   Damage → Replace.

Recommended Oil:
Foam-air-filter oil
or
SAE #20 motor oil

3. Install:
   - Air filter element
   - Air filter cover

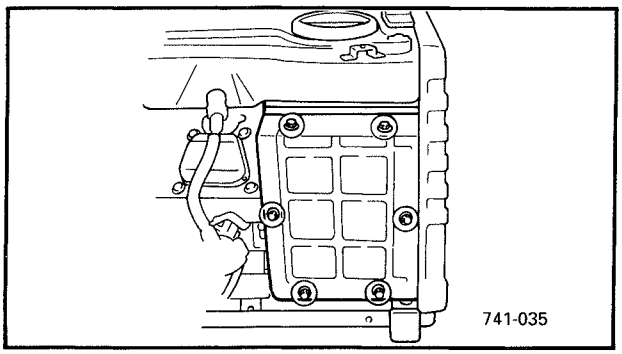
NOTE:

Do not wring out the element. This could cause it to tear.

CAUTION:

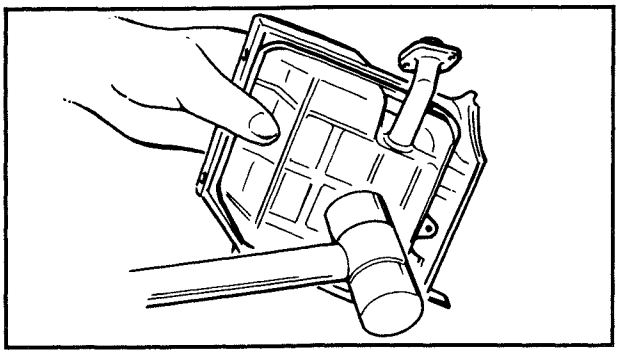
The engine should never run without the element; excessive piston and/or cylinder wear may result.

4. Install:
   - Rear cover



MUFFLER

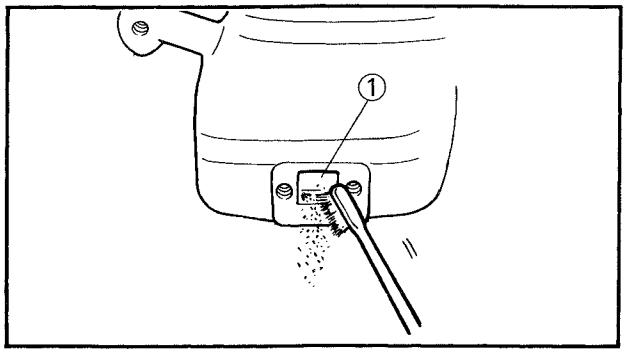
1. Remove:
   - Rear cover
   - Muffler



2. Decarbonize:
   1) Tap on the muffler in the area shown in the illustration.

CAUTION:

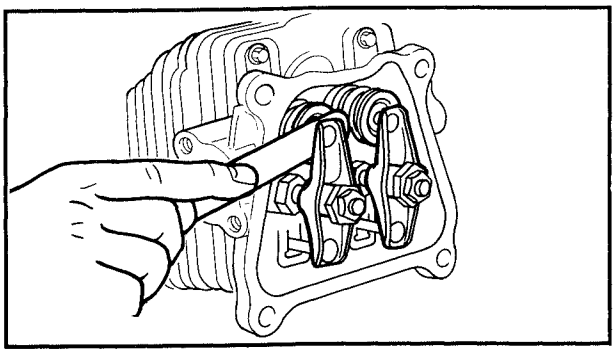
Don't use a wire to clean or the noise damping material may come out, reducing the damping effect.



2) Shake out the loose carbon from carbon outlet ① of muffler.

VALVE CLEARANCE ADJUSTMENT

1. Remove:
   - Body panel
   - Air shroud
   - Gasket
   - Cylinder head cover
   - Spark plug



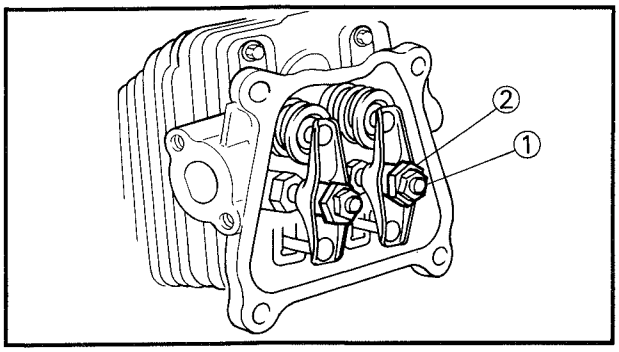
2. Measure:
   - Valve clearance

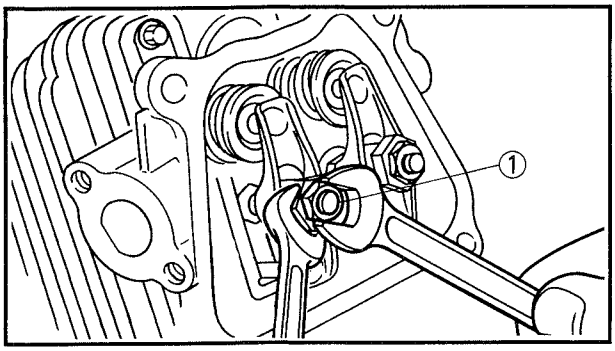
   Out of specification→Adjust.

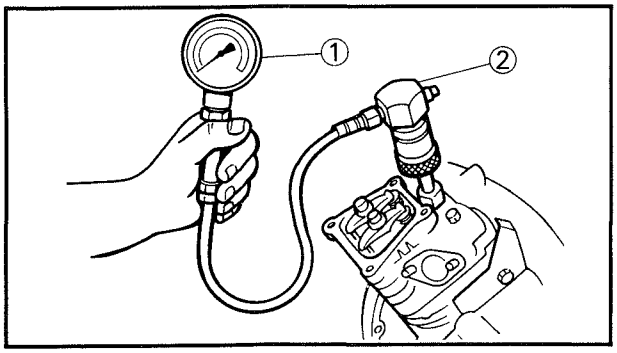
	Intake Valve (Cold)	Exhaust Valve (Cold)
	0.1 mm (0.004 in)	0.1 mm (0.004 in)

NOTE:

- Be sure piston is at Top Dead Center (TDC) on compression stroke when measuring clearance.
- Valve clearance must be measured when the engine is cool to the touch.







Valve clearance adjustment

1. Turn the crankshaft until the piston reaches top dead center (T.D.C.).
2. Loosen the locknut ① and insert the 0.1 mm (0.004 in) Thickness Gauge YU-26900-9 (90890-03079) between rocker arm and valve stem.
3. Turn the adjuster ② in or out to obtain the proper Thickness Gauge resistance by pushing and pulling it.

Adjuster	Resistance	Valve Clearance
Turn in	Increase	Decrease
Turn out	Decrease	Increase

4. Tighten the locknut ①.

Adjuster Locknut:
10 Nm (1.0 m•kg, 7.2 ft•lb)

COMPRESSION PRESSURE MEASUREMENT

Insufficient compression pressure will result in performance loss and may indicate leaking valves or worn or damaged piston rings.

1. Measure:
   - Valve clearance
2. Warm up engine for several minutes, then stop the engine.
3. Remove:
   - Spark plugs
4. Connect:
   - Compression Gauge YU-33223 (90890-03081) ①
   - Adapter YU-33223-3 (90890-04082) ②
5. Measure:
   - Compression

Standard compression pressure:
100 kPa (1.0 kg/cm², 14.2 psi)

⚠ WARNING

When cranking engine, ground spark plug wires to prevent sparking.

Compression test steps (below minimum levels):
- Squirt a few drops of oil into cylinder.
- Measure compression again

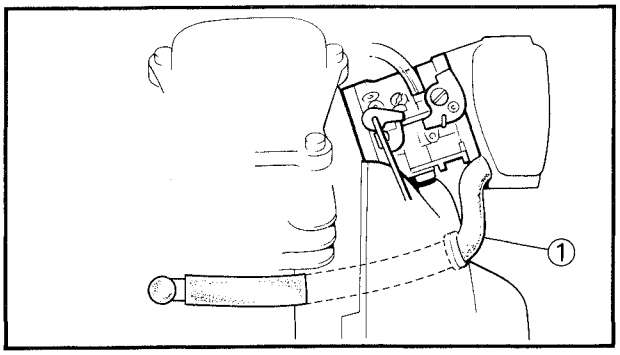
Reading	Diagnosis
Higher than without oil	•Worn cylinder, piston and piston rings
Same as without oil	•Defective piston, ring(s), valve(s) and cylinder head gasket •Improper valve timing and valve clearance

Compression test steps (above maximum levels):
- Check cylinder head, valve surfaces, or piston crown for carbon deposits.

CYLINDER HEAD

1. Remove:
   - Carbon deposits

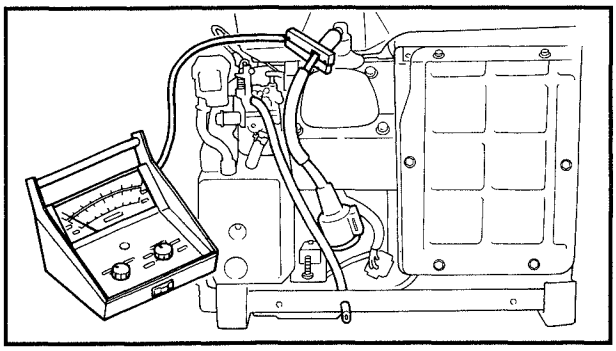
   Refer to the "CYLINDER HEAD INSPECTION" section in CHAPTER 3.

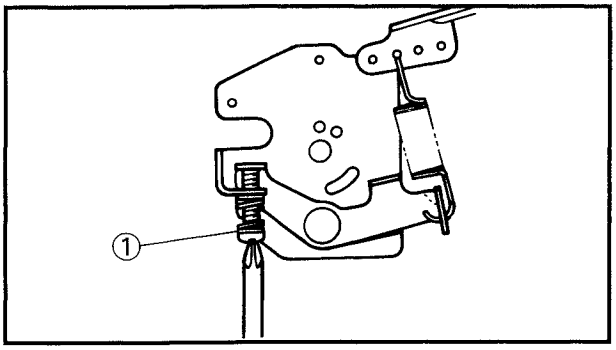


BREATHER HOSE INSPECTION

1. Inspect:
   - Crankcase breather hose ①

   Cracks/Damage→Replace.
   Loose connection→Correct.



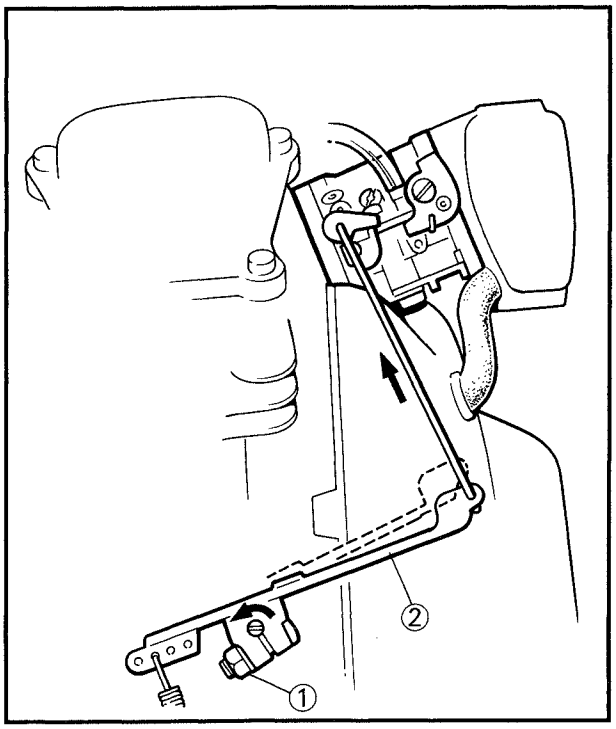


ENGINE SPEED ADJUSTMENT

1. Adjust:
   - Engine speed (with no load)

Engine speed adjustment steps:
1. Install the Tachometer (YU-8036-A).
2. Start the engine and warm up for a few minutes.
3. Adjust the engine speed by turning the adjust screw ① in or out.

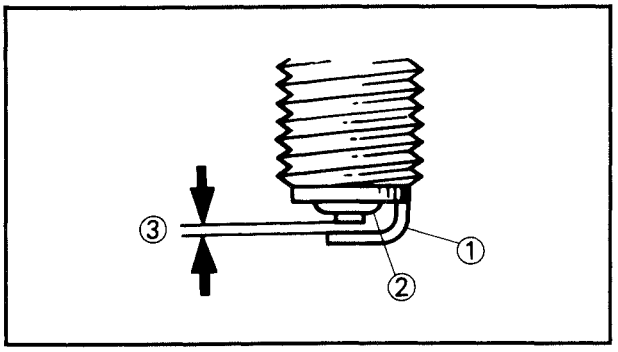
Engine speed (with no load):
3,700~3,800 rpm

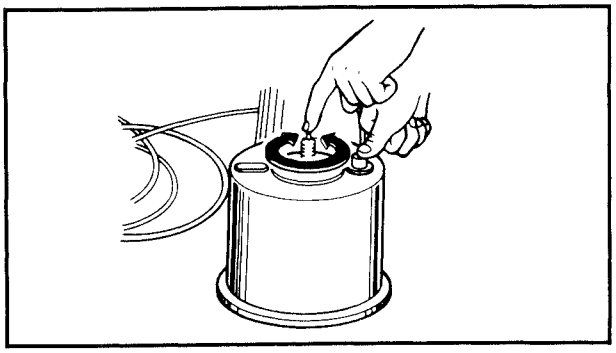


GOVERNOR ADJUSTMENT

1. Remove:
   - Body panel
   - Fuel tank
2. Adjust:
   - Governor

Governor adjustment steps:
1. Loosen the nut ①.
2. Turn the governor arm ② counterclockwise until it stops.
3. Turn the governor shaft counterclockwise until it stops.
4. Tighten the nut ①.





SPARK PLUG

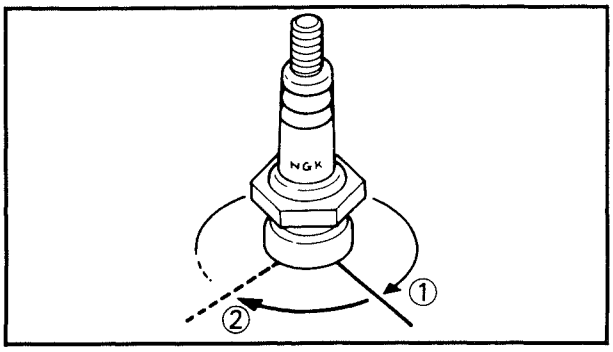
1. Remove:
   - Spark plug
2. Inspect:
   - Electrode ①
     Wear/Damage → Replace.
   - Insulator color ②
3. Measure:
   - Plug gap ③
     Out of specification → Regap.
     Use a Wire Gauge or Feeler Gauge.

Spark Plug Gap:
0.6~0.7 mm (0.024~0.028 in)

Clean the plug with a spark plug cleaner if necessary.

Standard Spark Plug:
BPR6HS (NGK)

Before installing a spark plug, clean the gasket surface and plug surface.



4. Tighten:
   - Spark plug

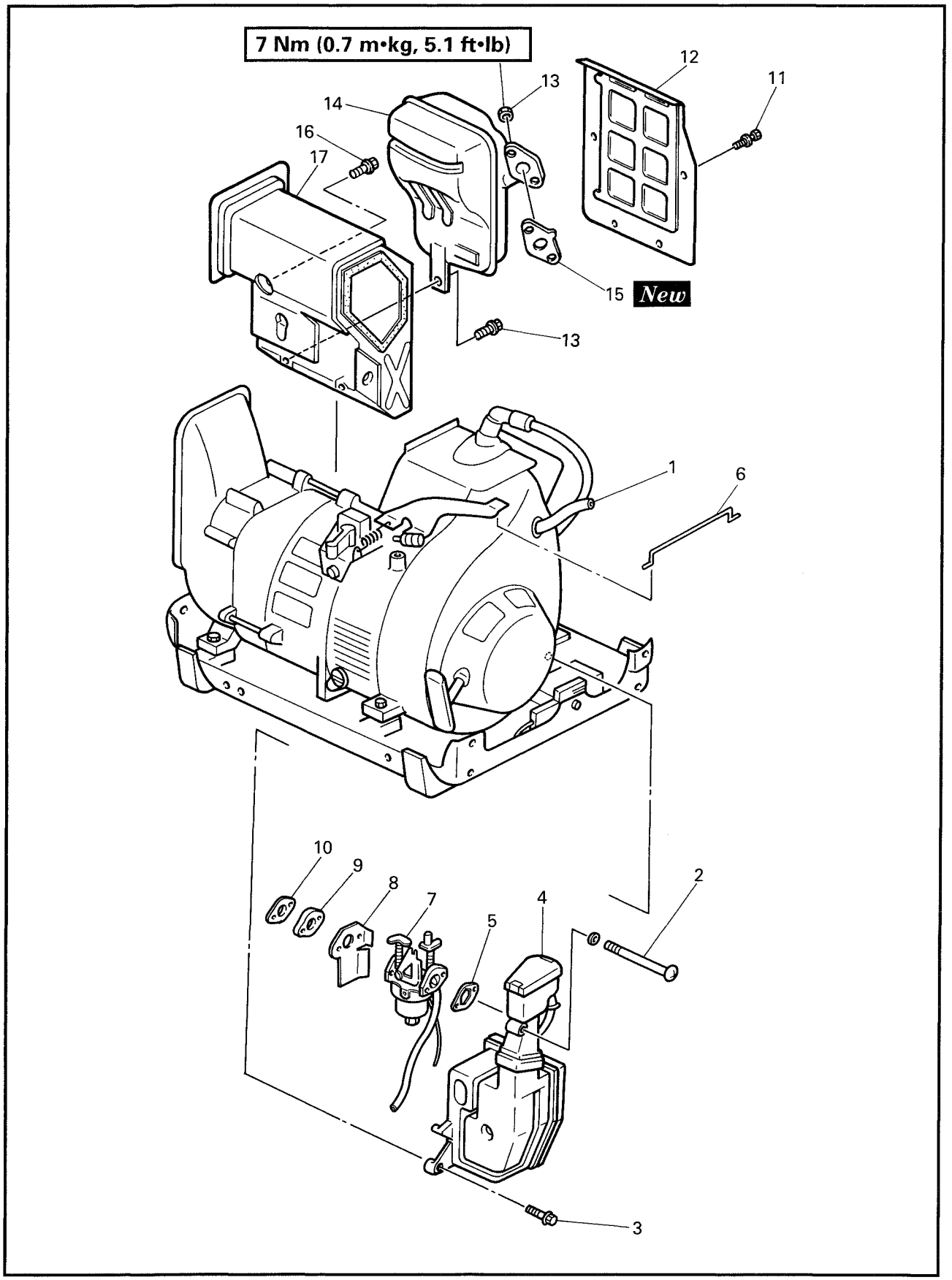
Spark Plug:
20 Nm (2.0 m•kg, 14.5 ft•lb)

NOTE:

Finger-tighten ① the spark plug before torquing ② to specification.

ENGINE

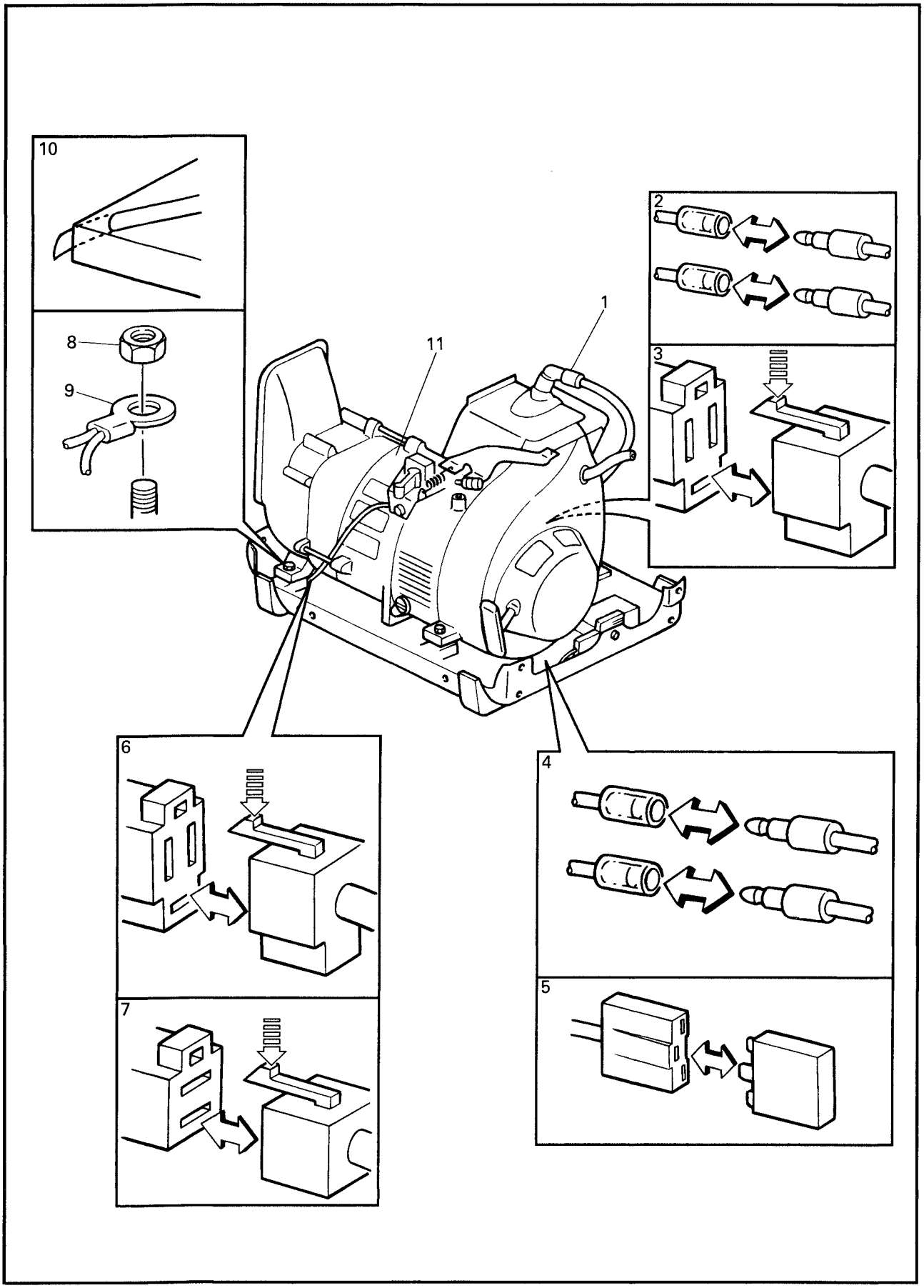
AIR FILTER, CARBURATOR, MUFFLER



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of Air filter, Carburator and Muffler		Remove the parts in order.
	Body cover		Refer to "BODY COVER" section in CHAPTER 2.
	Fuel tank		Refer to "FUEL TANK" section in CHAPTER 2.
1	Crankcase breather hose	1	
2	Screw	2	
3	Bolt	1	
4	Air filter assmbly	1	
5	Air filter gasket	1	
6	Governor link rod	1	
7	Carburetor assembly	1	
8	Carburetor cover	1	
9	Joint	1	
10	Intake manifold gasket	1	
11	Bolt	6	
12	Muffler cover 2	1	
13	Nut/Bolt	2/1	
14	Muffler assembly	1	
15	Muffler gasket	1	
16	Bolt	2	
17	Muffler cover 1	1	
			Reverse the removal procedure for installation.

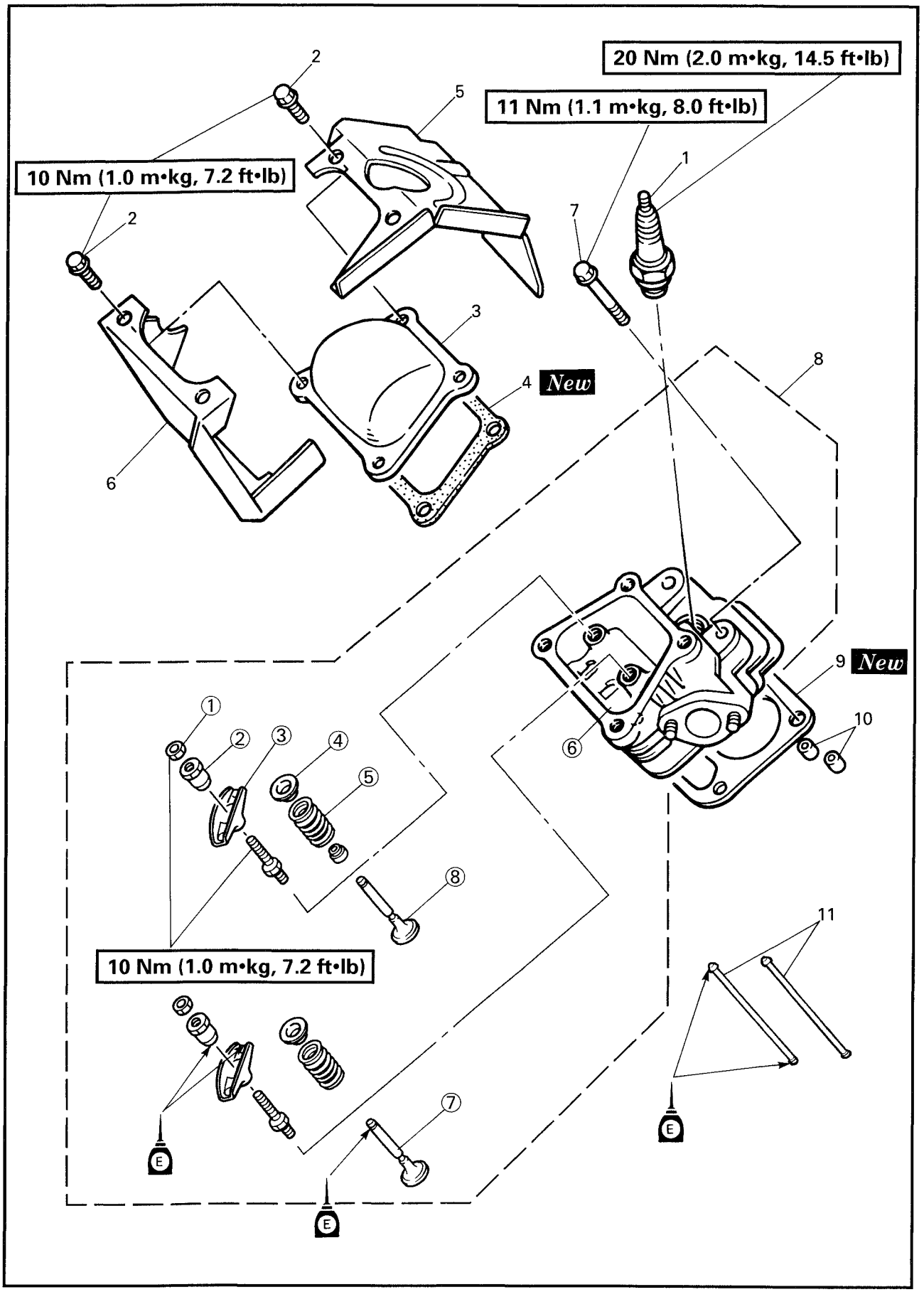
ENGINE



JOB INSTRUCTION CHART

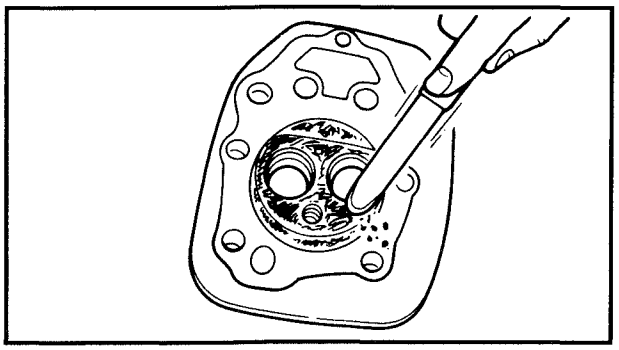
Order	Job name/Parts name	Q'ty	Remarks
	Removal of Engine		Remove the parts in order.
	Body cover/Fuel tank		Refer to "BODY COVER" and "FUEL TANK" section.
	Muffler/Air filter		Refer to "MUFFLER" and "AIR FILTER" section.
1	Spark plug cap	1	
2	Oil level lead/Engine stop lead	1	
3	C.D.I. coupler	1	
4	Condenser lead	2	
5	DC rectifier coupler	1	
6	Main coil coupler	1	
7	Sub coil coupler	1	
8	Nut	4	
9	Earth lead	1	
10	Fuel tank breather hose	1	
11	Engine assembly	1	Reverse the removal procedure for installation.

CYLINDER HEAD COVER, CYLINDER HEAD, VALVE



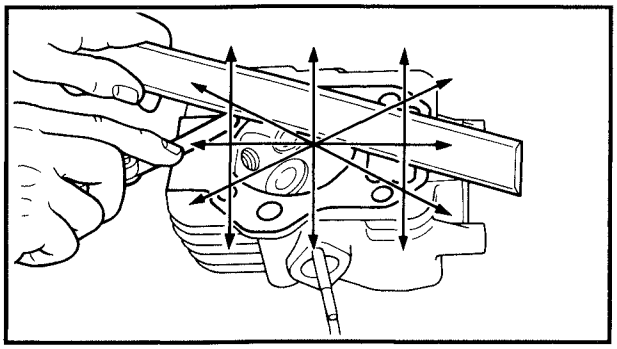
JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of cylinder head cover, cylinder head and valve		Remove the parts in order.
	Recoil starter		Refer to "RECOIL STARTER" section in chapter 3.
	Air filter, Carburetor		Refer to "CARBURETOR" section in chapter 3.
1	Spark plug	1	
2	Bolt	4	
3	Cylinder head cover	1	
4	Gasket	1	
5	Air shround 1	1	
6	Air shround 2	1	
7	Bolt	4	NOTE: Follow proper tightening sequence.
8	Cylinder head	1	NOTE: Set the piston at compression top dead center before removal.
9	Gasket	1	
10	Dowel pin	2	
11	Push rod	2	
			Reverse the removal procedure for installation.
	Disassembly of Cylinder head		Disassemble the parts in the order.
①	Locknut	2	
②	Adjuster	2	
③	Rocker arm	2	
④	Valve retainer	2	
⑤	Valve spring	2	
⑥	Push rod guide	1	
⑦	Exhaust valve	1	
⑧	Intake valve	1	
			Reverse the disasembly procedure for assembly.



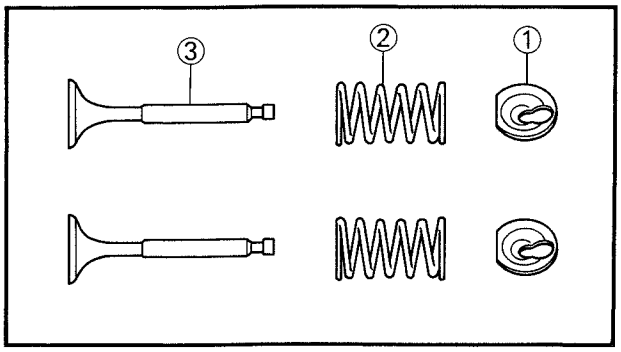
CYLINDER HEAD INSPECTION

1. Remove:
   - Carbon deposits
     Use rounded scraper.



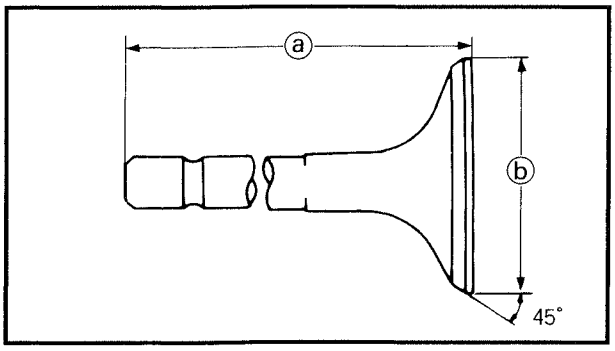
2. Measure:
   - Cylinder head warpage
     Exceeds allowable limit →Resurface.

Warpage Limit:
0.1 mm (0.004 in)



VALVE REMOVAL

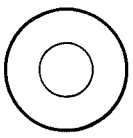
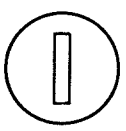
1. Remove:
   - Valve spring retainer ①
   - Vale spring ②
   - Valve ③

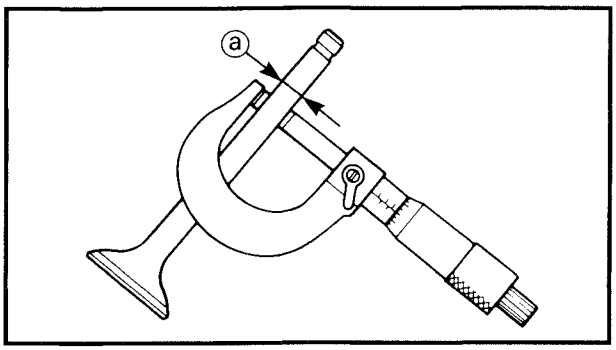


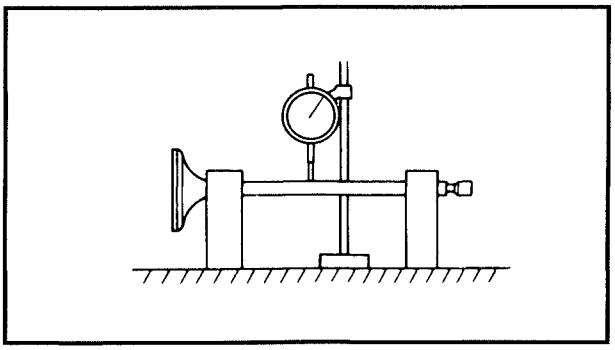
VALVE INSPECTION

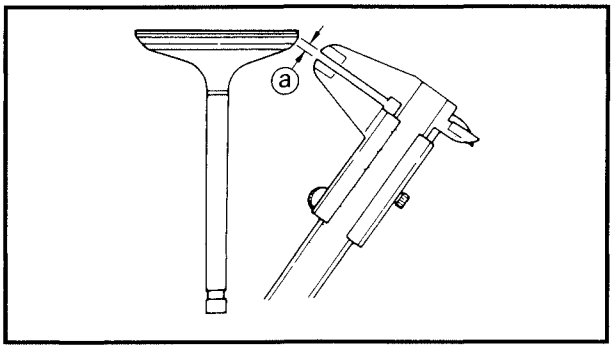
1. Inspect:
   - Valve length ⓐ
   - Valve face diameter Ⓑ

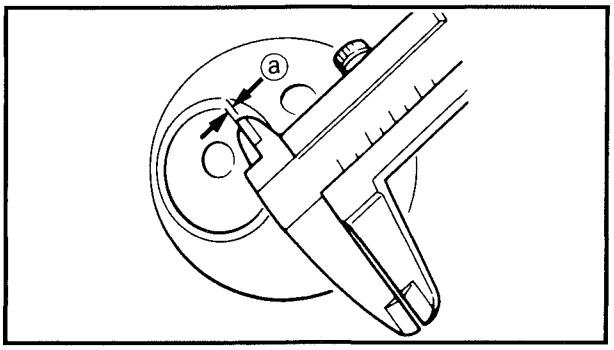
Valve length:
Intake: 53.4 mm (2.10 in)
Exhaust: 53.6 mm (2.11 in)
Valve face diameter:
Intake: 19.0 mm (0.75 in)
Exhaust: 17.0 mm (0.67 in)

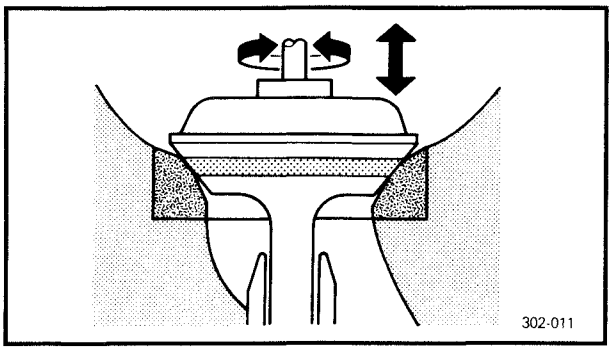
Intake Valve face:	Exhaust Valve face:
	











2. Inspect:
   - Valve stem diameter ⓐ

   Out of specification→Replace.

Valve stem diameter:
Standard:
Intake: 5.0 mm (0.2 in)
Exhaust: 5.0 mm (0.2 in)
Limit:
Intake: 4.89 mm (0.193 in)
Exhaust: 4.87 mm (0.192 in)

3. Measure:
   - Valve stem bend

Valve stem bend limit:
0.01 mm (0.0004 in)

Out of specification→Replace.

VALVE SEAT INSPECTION

1 .Measure:
- Valve contact width ⓐ

Poor seating →Looping.
Out of specification→Replace.

Valve contact width:
Standard: 0.7 mm (0.03 in)
Limit: 1.2 mm (0.047 in)

2. Measure:
   - Valve seat contact width ⓐ

Poor seating →Looping.
Out of specification→Replace.

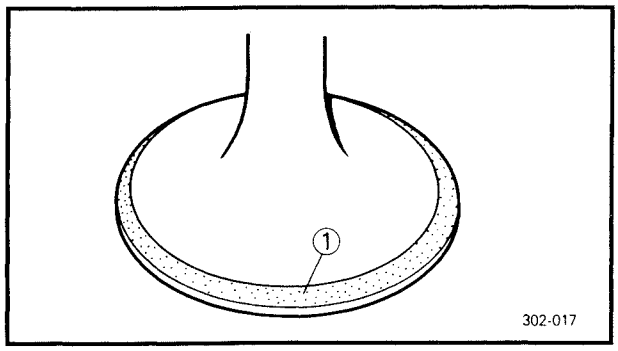
Valve seat contact width:
Standard: 0.7 mm (0.03 in)
Limit: 1.2 mm (0.047 in)

Valve/Valve Seat Assembly Lapping

1. Apply:
   - Coarse lapping compound (Small amount to valve face)
2. Position:
   - Valve

   (in cylinder head)

3. Rotate:
   • Valve
   Turn until valve and valve seat are evenly polished, then clean off compound.
4. Repeat above steps with fine compound and continue lapping until valve face shows a completely smooth surface uniformly.

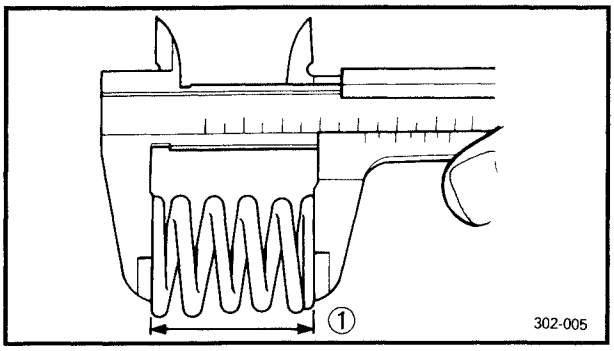


5. Eliminate:
   • Compound
   (from valve face)
6. Apply:
   • Mechanic's bluing dye (Dykem) ①
   (to valve face and seat)

7. Rotate:
   • Valve
   Valve must make full seat contact indicated by grey surface all around valve face where bluing was removed.
8. Apply:
   • Solvent
   (into each intake and exhaust port)
   Leakage past valve seat → Repeat valve lapping until seal is complete.

NOTE:

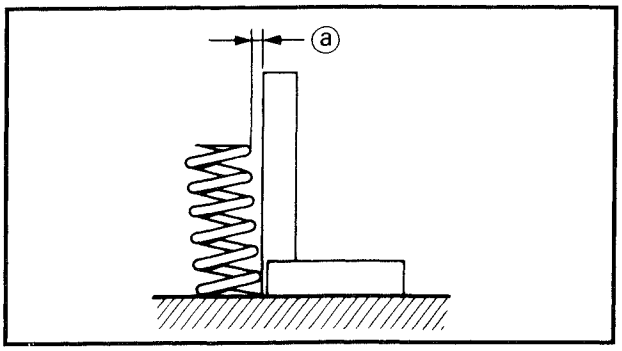
Pour solvent into intake and exhaust ports only after completion of all valve work and assembly of head parts.



Valve Spring Measurement

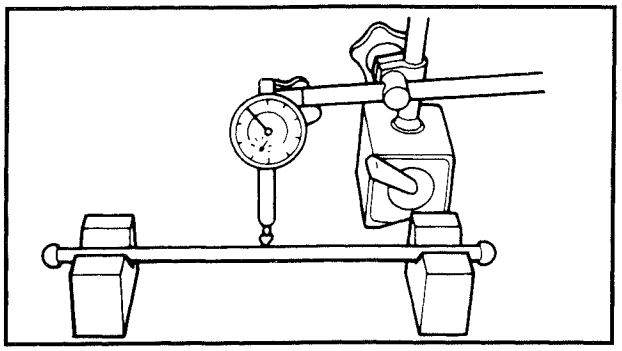
1. Measure:
   • Valve spring free length ①
   Out of specification → Replace.

Valve spring free length:
27.4 mm (1.08 in)
Limit:
24.4 mm (0.96 in)



2. Measure:
   - Valve spring tilt ⓐ
     Use a square
     Out of specification→Replace.

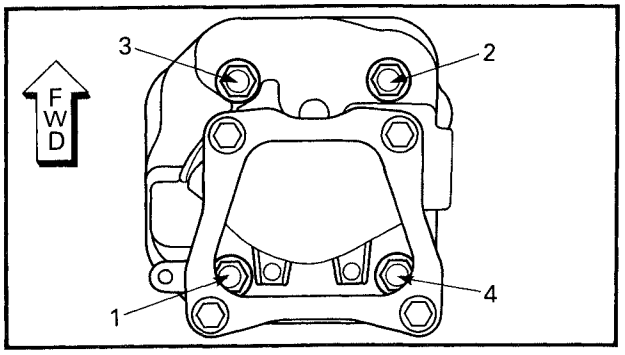
	Tilt limit: **0.8 mm (0.031 in)**



PUSH ROD INSPECTION

1. Measure:
   - Push rod bend
     Roll on V-block
     Exceeds bending limit→Replace.

	Bend Limit: **0.5 mm (0.02 in)**



CYLINDER HEAD INSTALLATION

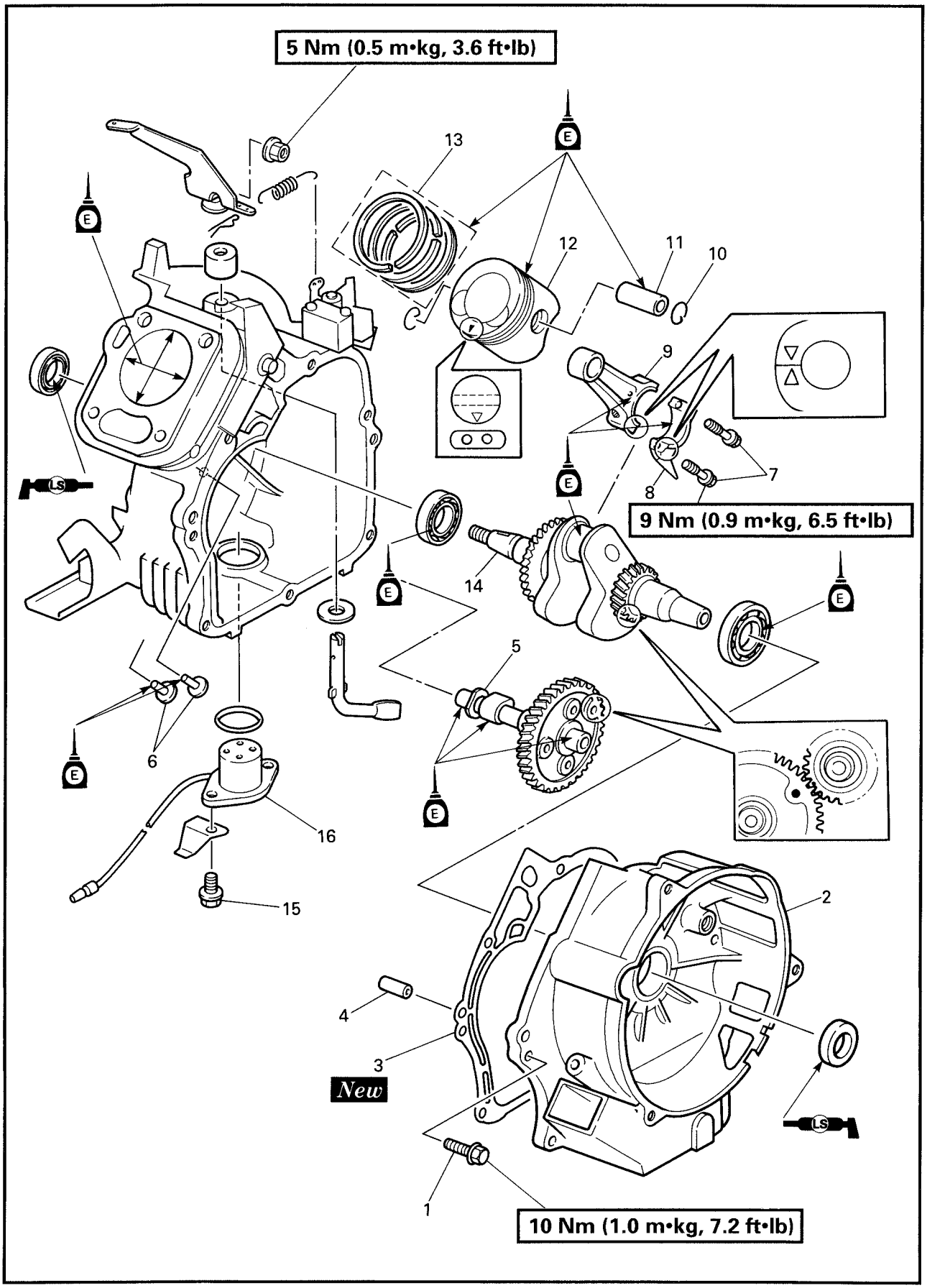
1. Install:
   - Cylinder head assembly

NOTE:
Follow proper tightening sequence.

	Cylinder head bolt: **11 Nm (1.1 m•kg, 8.0 ft•lb)**

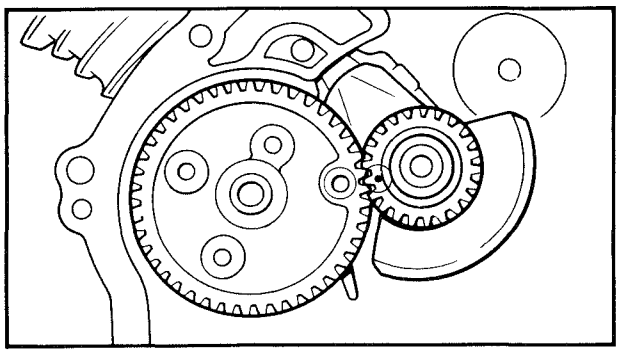
2. Adjust:
   - Valve clearance
     Refer to "VALVE CLEARANCE ADJUSTMENT" section in CHAPTER 2.

PISTON, CAMSHAFT, CRANKCASE, CRANKSHAFT



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of Piston, Camshaft Crankcase and Crankshaft		Remove the parts in order.
	Generator, Rotor		Refer to the "GENERATOR" section.
	Engine		Refer to the "ENGINE" section
	Flywheel		Refer to the "FLYWHEEL" section.
1	Bolt	7	NOTE: Follow proper tightening sequence.
2	Crankcase cover	1	
3	Gasket	1	
4	Dowel pin	2	
5	Camshaft	1	NOTE: Be sure to align the camshaft gear mark with crankshaft gear mark.
6	Valve lifter	2	
7	Bolt	2	
8	Connecting rod cap	1	NOTE: Be sure the connecting rod mark is aligned with the cap mark.
9	Connecting rod		
10	Piston pin circlip	2	
11	Piston pin	1	
12	Piston	1	NOTE: Be sure the " ∇ " mark on the piston head faces to push rod side.
13	Piston ring	3	NOTE: Be sure to install rings so that manufacturer's marks faces to piston head. Be sure each piston ring end is positioned as illustration.
14	Crankshaft	1	
15	Bolt	2	
16	Oil level gauge	1	
			Reverse the removal procedure for installation.

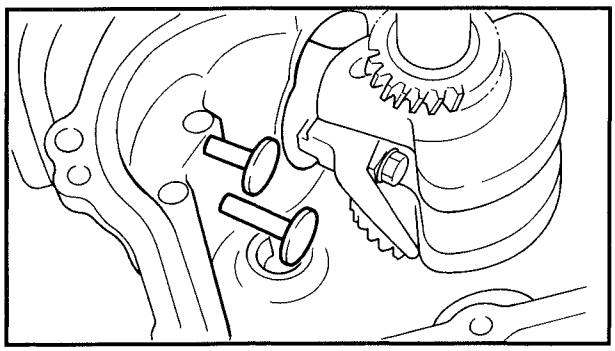


CRANKSHAFT REMOVAL

1. Remove:
   - Camshaft

NOTE:

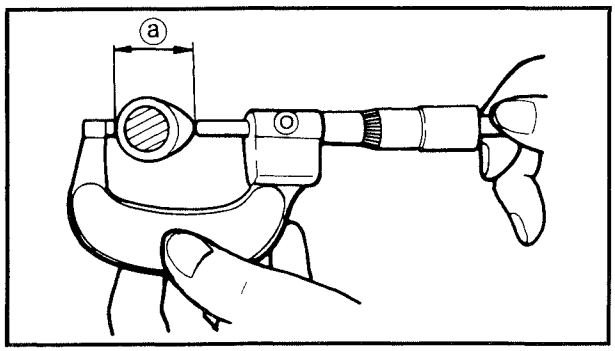
Remove the camshaft, facing the camshaft gear mark to the crankshaft gear mark.



2. Remove:
   - Valve lifter

CAUTION:

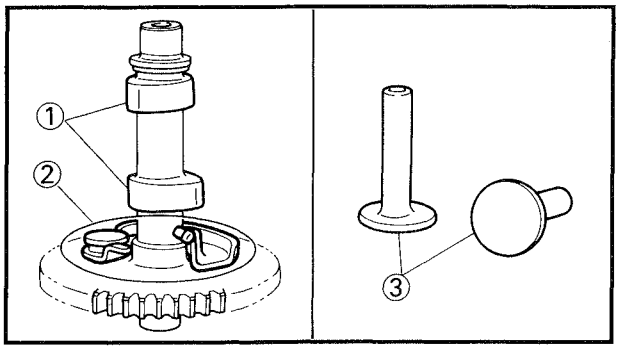
Mark the valve lifters so that the exhaust and intake valve sides are not confused.



CAMSHAFT AND VALVE LIFTER INSPECTION

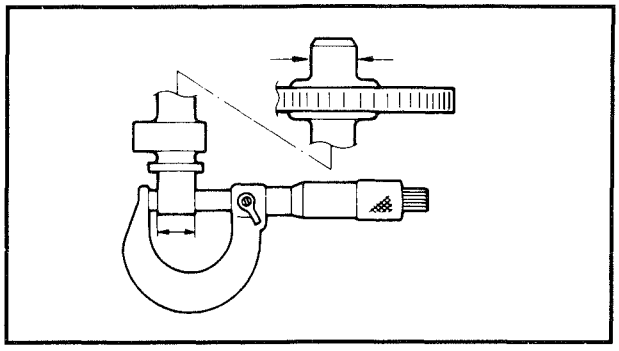
1. Measure:
   - Cam lobes length ⓐ
     Use a micrometer.
     Out of specification→Replace.

Cam lobe length ⓐ:
Standard: 20.5 mm (0.81 in)
Limit: 20.25 mm (0.80 in)



2. Inspect:
   - Camshaft ①
   - Decompressor ②
   - Valve lifter ③

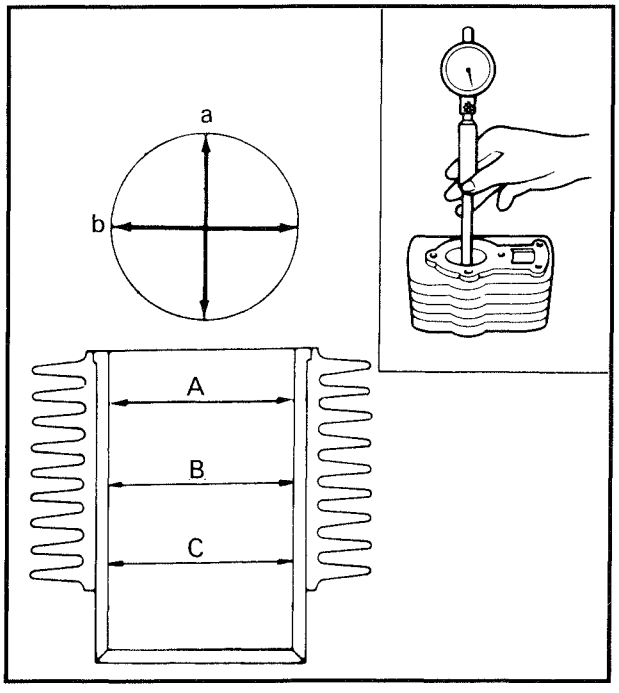
   Damage/Wear→Replace.



3. Measure:
   - Camshaft diameter

   Out of specification→Replace.

Camshaft diameter:
Standard: 12.0 mm (0.472 in)
Limit: 11.9 mm (0.468 in)



CRANKCASE INSPECTION

1. Inspect:
   - Cylinder walls

   Vertical scratches→Rebore or replace cylinder.
2. Measure:
   - Cylinder inside diameter "D"

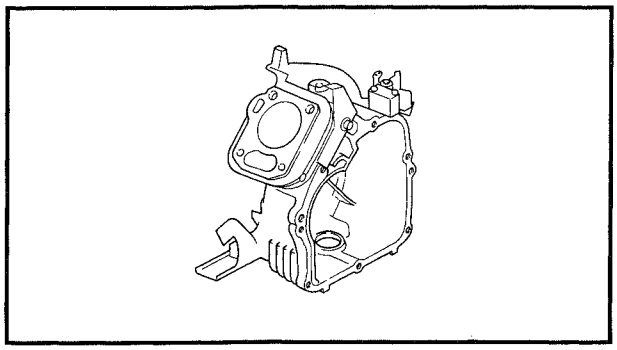
NOTE:

Obtain measurements at three depths by placing measuring instrument parallel to and at right angles to crankshaft.

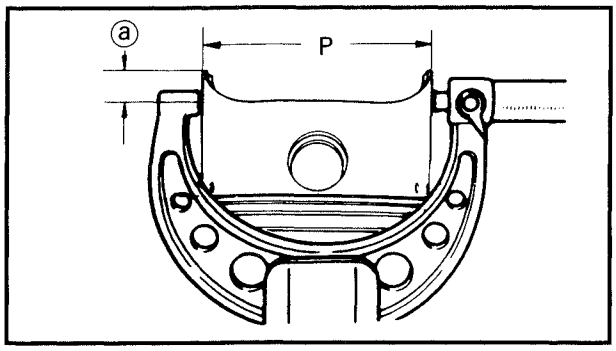
Out of specification→Rebore cylinder, and replace piston and piston rings.

	Standard	Wear limit
Cylinder inside diameter " D "	50.0 mm (1.969 in)	50.15 mm (1.974 in)
Cylinder taper " T "	0 mm (0 in)	0.5 mm (0.02 in)

D=Maximum A,B,C
T=Maximum A–Minimum C



3. Inspect:
   - Crankcase
     Damage→Replace.
   - Bearing
     Roughness→Replace bearing.



PISTON, PISTON PIN AND PISTON RING INSPECTION

1. Measure:
   - Piston skirt diameter "P"

ⓐ=10 mm (0.4 in) from the piston bottom edge.

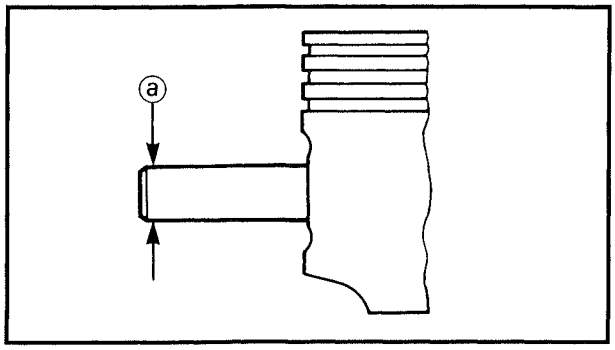
Piston size P:
Standard: 50.0 mm (1.969 in)
Limit: 49.93 mm (1.966 in)

2. Measure:
   - Piston clearance

Piston clearance=
Cylinder inside diameter " D "—
Piston skirt diameter " P "

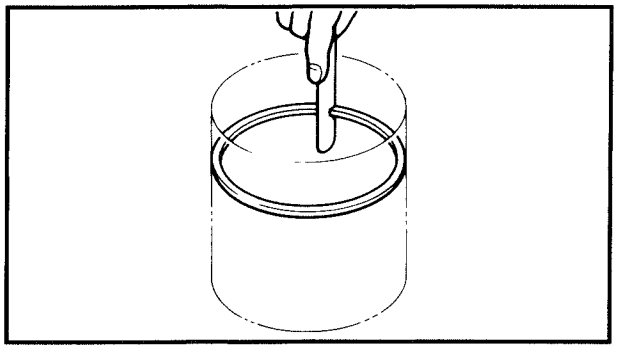
Out of specification→Rebore cylinder and replace piston and piston rings.

Piston clearance:
0.020~0.035 mm
(0.0008~0.0014 in)



3. Measure:
   - Piston pin diameter ⓐ
     Use a micrometer.
     Out of specification→Replace.

Standard piston pin diameter:
12.0 mm (0.47 in)
Piston pin wear limit:
11.9 mm (0.468 in)

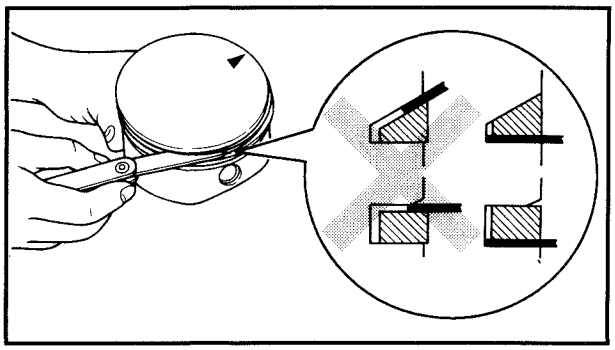


4. Measure:
   - Piston ring end gap
     Use a Thickness gauge.
     Out of specification→Replace.

NOTE:

You cannot measure end gap on expander spacer of oil control ring. If control ring rails show excessive gap, replace all three rings.

Piston ring end gap:
0.1~0.25 mm (0.004~0.01 in)
Piston ring end gap limit:
0.9 mm (0.0354 in)

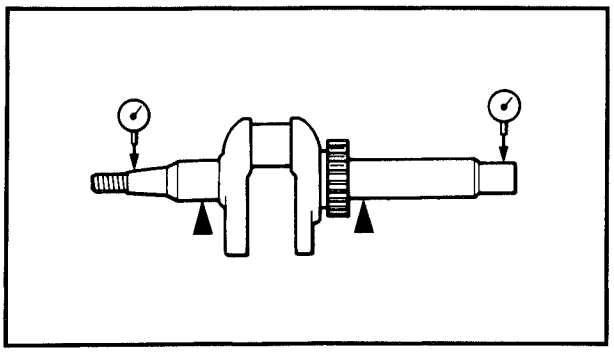


5. Measure:
   - Piston ring side clearance
     Use a Thickness gauge.
     Out of specification→Replace.

NOTE:

Clean carbon from piston ring grooves and rings before measuring side clearance.

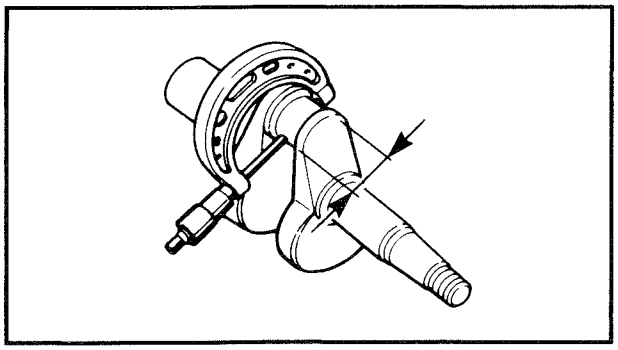
Piston ring side clearance
Top ring:
0.06 mm (0.0024 in)
2nd ring and oil ring:
0.04 mm (0.0016 in)
Piston ring side clearance limit:
0.15 mm (0.006 in)



CRANKSHAFT INSPECTION

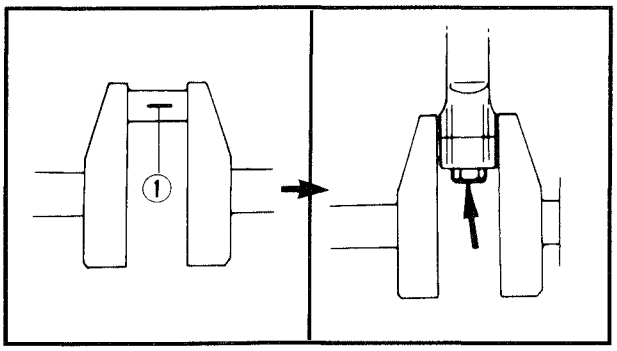
1. Measure:
   - Crankshaft runout
     Use a Dial gauge.
     Out of specification→Replace.

Crankshaft runout limit:
0.02 mm (0.0008 in)



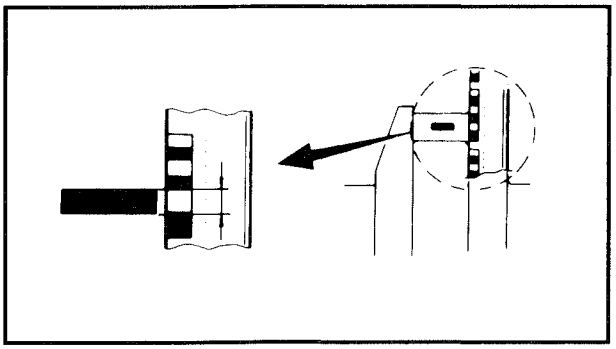
2. Measure:
   - Crankpin outside diameter
     Use a micrometer.
     Out of specification→Replace.

Crankpin outside diameter:
22.0 mm (0.87 in)
Crankpin outside diameter limit:
21.9 mm (0.86 in)



3. Measure:
   - Oil clearance
     Use a plastigauge®.
     Out of specification→Replace connecting rod.

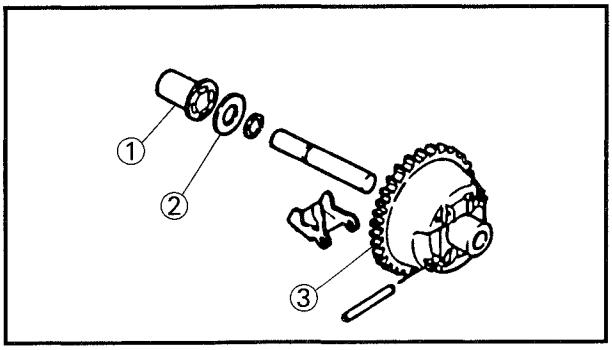
Oil clearance:
0.016~0.034 mm
(0.0006~0.0013 in)
Oil clearance limit:
0.1 mm (0.004 in)



Oil clearance measuring steps:
1. Clean all parts thoroughly.
2. Place plastigauge® onto crankpin.
3. Install the connecting rod and cap onto crankcase.
4. Torque both cap bolts evenly.

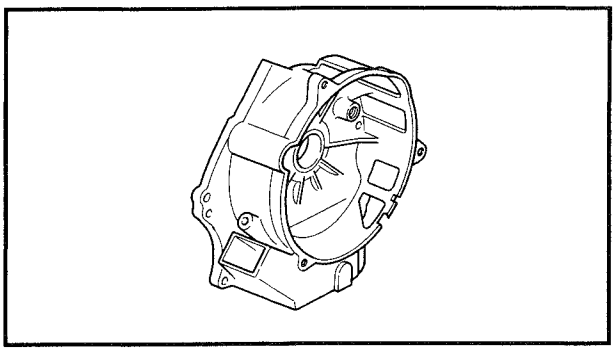
Connecting rod cap bolt:
9 Nm (0.9 m•kg, 6.5 ft•lb)

5. Remove the connecting rod and measure the plastigauge® width.



FLYWEIGHT SHAFT (GOVERNOR) GEAR INSPECTION

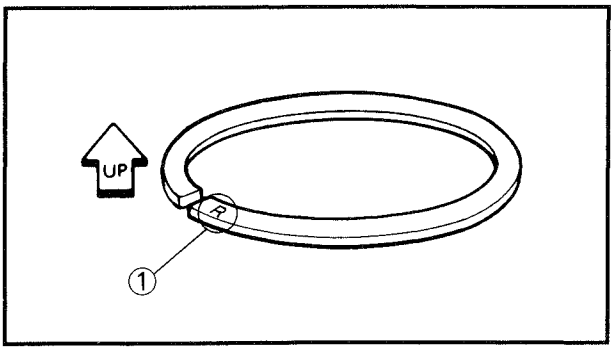
1. Inspect:
   - Collar ①
   - Washer ②
   - Flyweight gear ③
     Damage/Wear→Replace.



CRANKCASE COVER INSPECTION

1. Inspect:
   - Crankcase cover
   - Bearing

   Damage/Roughness→Replace.

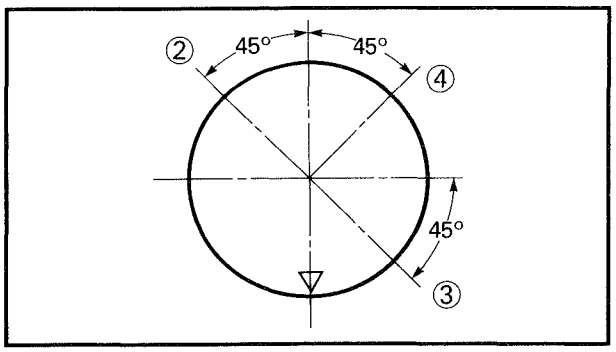


PISTON RING AND PISTON INSTALLATION

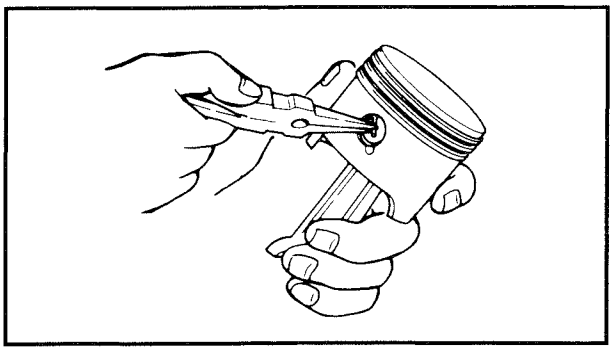
1. Install:
   - Piston rings

CAUTION:

- **Be sure to install rings so that manufacturers marks ① faces to piston head.**
- **Be sure each piston ring end is positioned as illustration.**

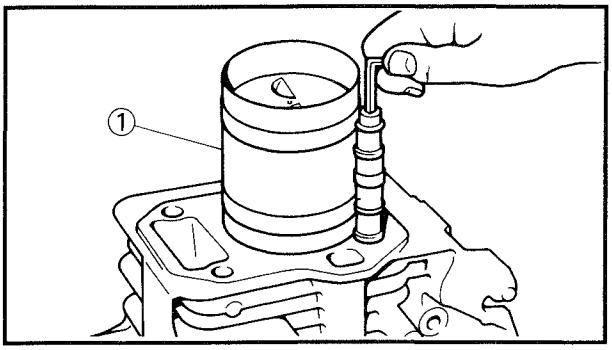


Top ring	②	
2nd ring	③	
Oil ring	④	



2. Install:
   - Piston pin
   - Piston pin circlips

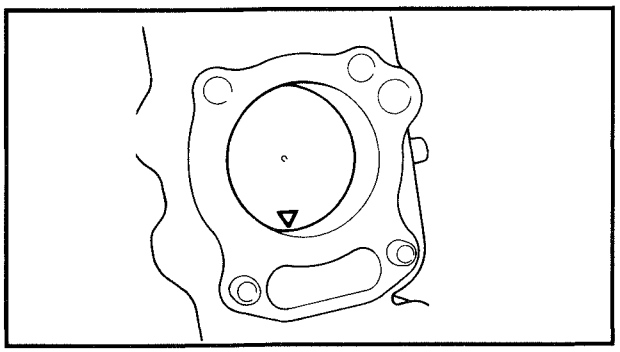
New	**Piston pin circlip:**



3. Install:
   - Piston

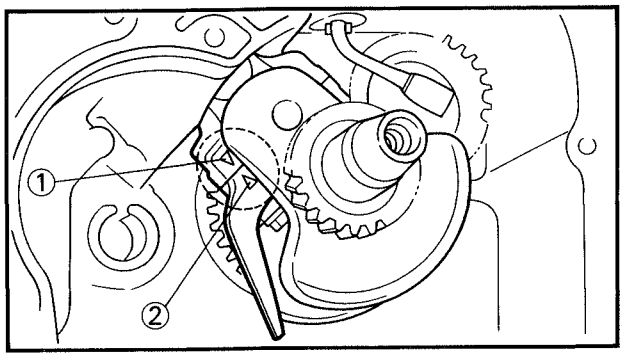
   Use a piston ring compressor ①.

	Piston ring compressor: YU-33294(90890-05158)



CAUTION:

Be sure the " ▽ " mark on the piston head faces to push rod side.



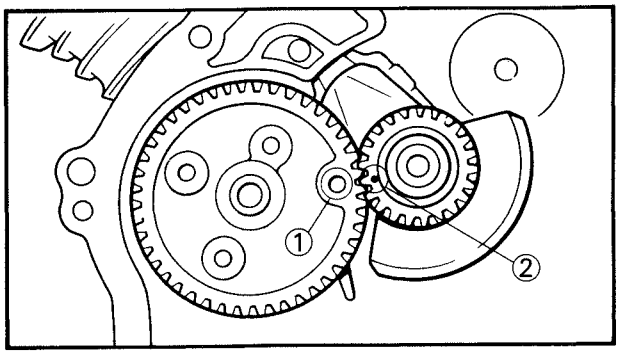
CONNECTING ROD INSTALLATION

1. Install:
   - Connecting rod cap

CAUTION:

Be sure the connecting rod mark ① is aligned with the cap mark ②.

Connecting rod cap bolt:
9 Nm (0.9 m•kg, 6.5 ft•lb)

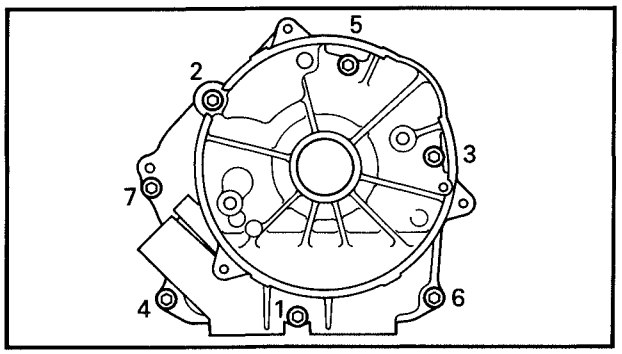


CAMSHAFT INSTALLATION

1. Install:
   - Camshaft

CAUTION:

Be sure to align the camshaft gear mark ① with crankshaft gear mark ②.



CRANKCASE COVER INSTALLATION

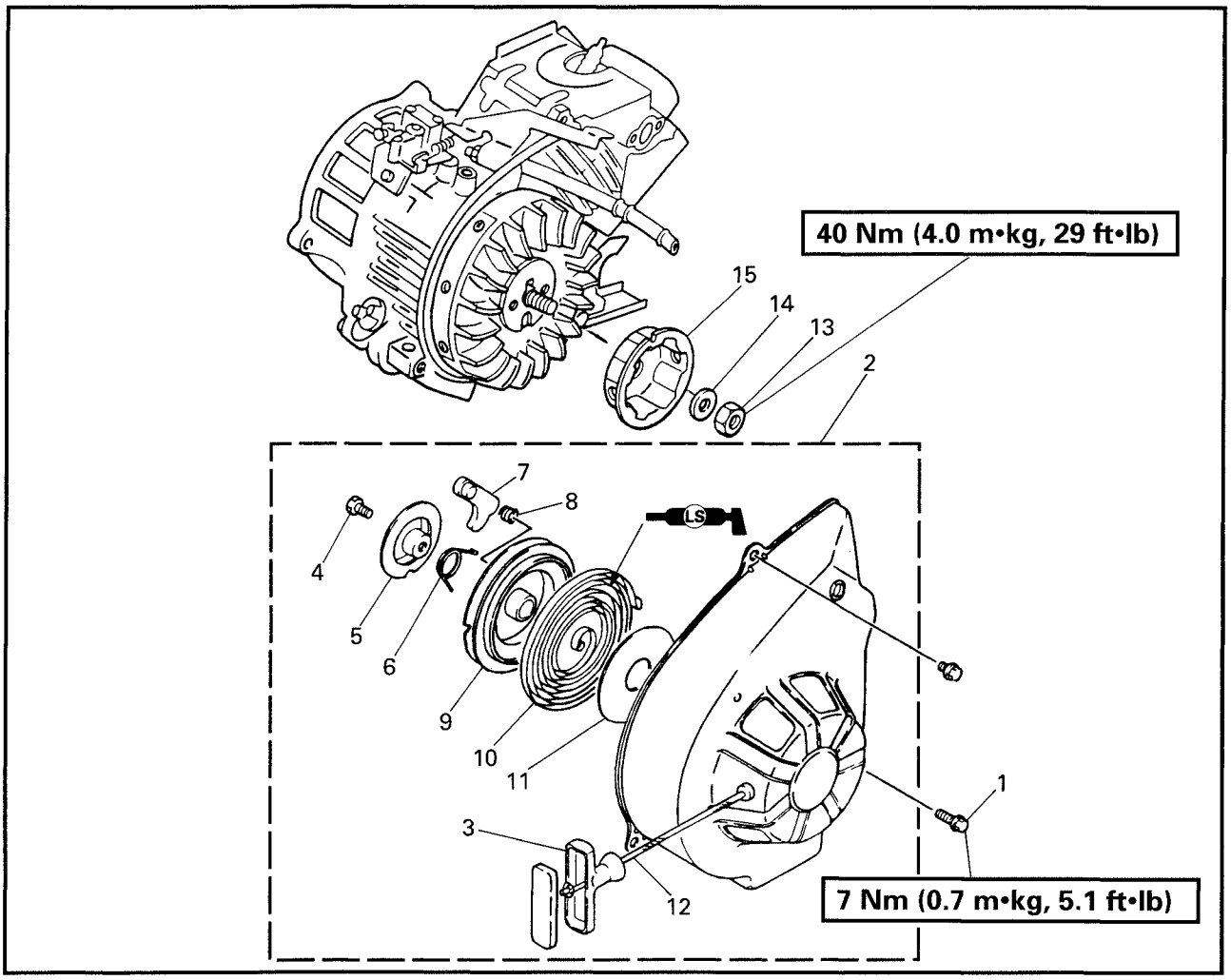
1. Install:
   - Crankcase cover

Crankcase cover bolt:
10 Nm (1.0 m•kg, 7.2 ft•lb)

CAUTION:

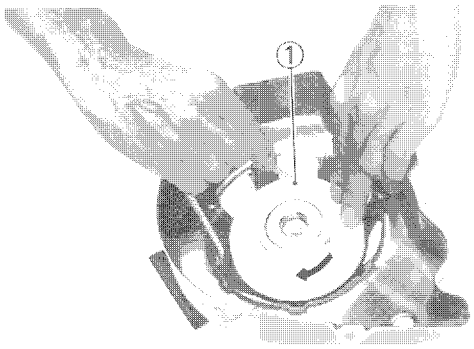
Follow proper tightening sequence.

RECOIL STARTER



JOB INSTRUCTION CHART

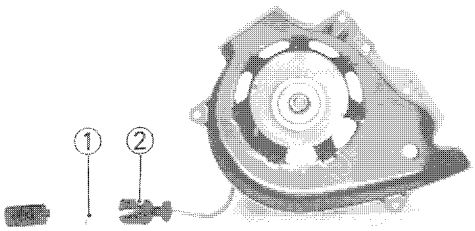
Order	Job name/Parts name	Q'ty	Remarks
	Removal of recoil starter		Remove the parts in order.
	Body cover/Fuel tank		Refer to the "BODY COVER" and "FUEL TANK" section in CHAPTER 2.
1	Bolt	4	
2	Recoil starter	1	
3	Starter handle	1	
4	Bolt	1	
5	Drive plate	1	
6	Drive spring	1	
7	Drive pawl	1	
8	Spring	1	
9	Drum sheave	1	
10	Starter spring	1	
11	Spacer	1	
12	Starter rope	1	
13	Nut	1	
14	Washer	1	
15	Starter pulley	1	
			Reverse the removal procedure for installation.



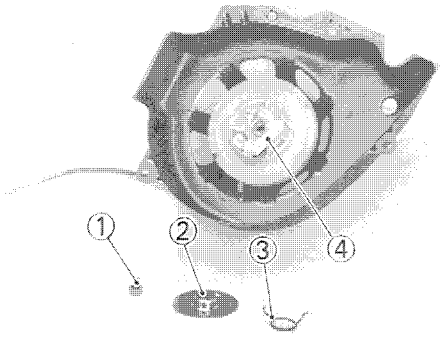
RECOIL STARTER REMOVAL

CAUTION:

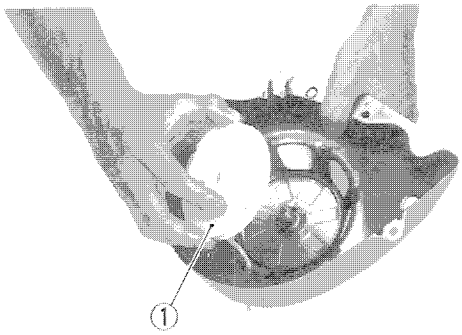
Release the spring pre-load before removing the sheave drum bolt. Hook the rope into the sheave drum slot ① and turn the sheave drum assembly clockwise.



1. Untie:
   - Knot ①
2. Remove:
   - Starter handle ②



3. Remove:
   - Bolt ①
   - Drive plate ②
   - Drive spring ③
   - Drive pawl ④



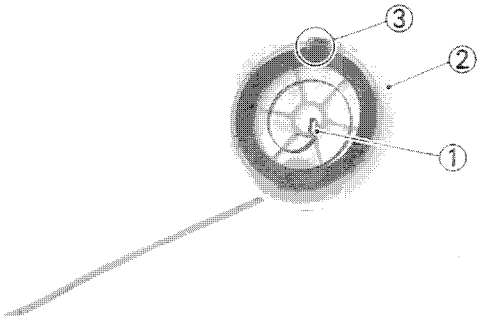
4. Remove:
   - Drum sheave ①
   - Starter spring
   - Spacer

CAUTION:

Be sure to hold the starter spring in the drum sheave. The spring will spread out suddenly when it is removed from the sheave drum.

RECOIL STARTER INSPECTION

1. Inspect:
   - Starter rope
     Damage/Wear→Replace.
   - Drive pawl
     Damage/Wear→Replace.
   - Starter spring
     Contamination→Clean and apply the grease.
     Damage/Wear→Replace.
   - Starter case
     Cracks/Damage→Replace.

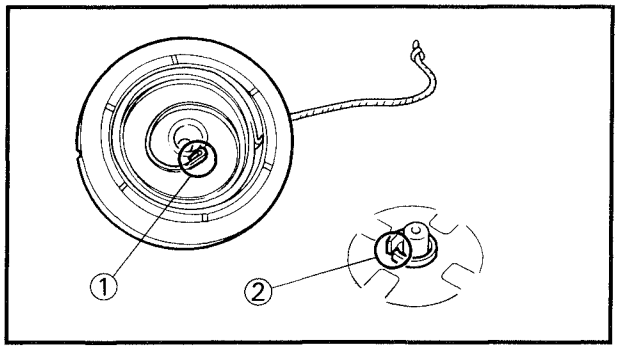


RECOIL STARTER INSTALLATION

1. Install:
   - Starter spring ①
   - Sheave drum ②

CAUTION:

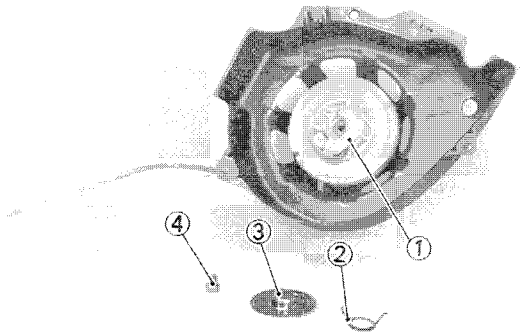
Engage the spring hook ③ with the drum slit, then wind the spring counterclockwise into the drum from larger to smaller diameter.



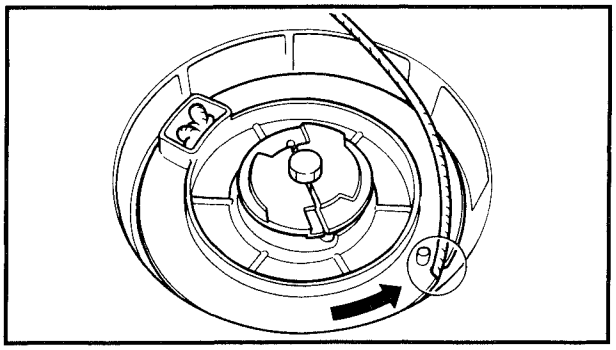
2. Install:
   - Starter rope

CAUTION:

Engage the spring hook ① with the starter case hook ②.



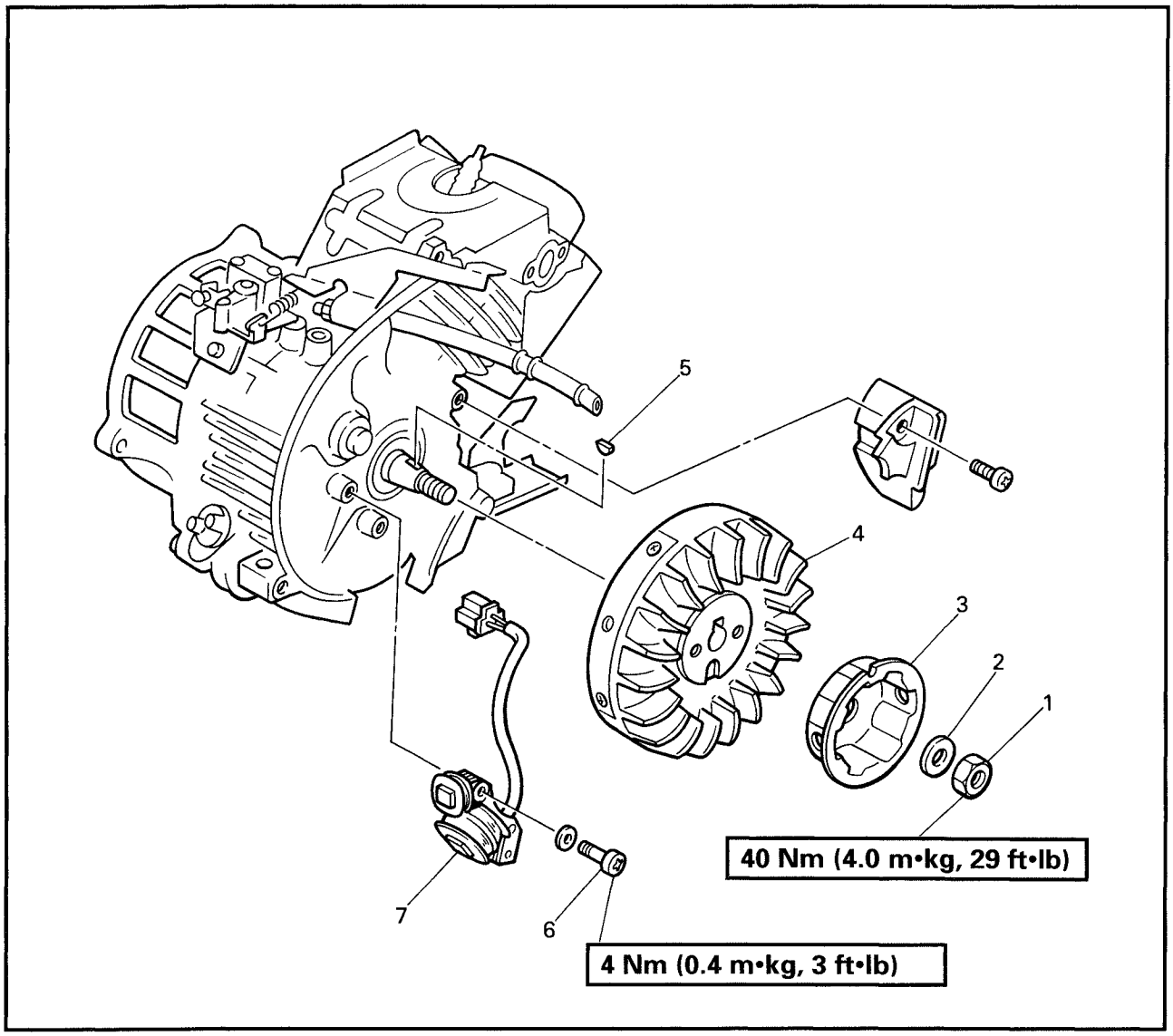
3. Install:
   - Drive pawl ①
   - Drive spring ②
   - Drive plate ③
   - Bolt ④



CAUTION:

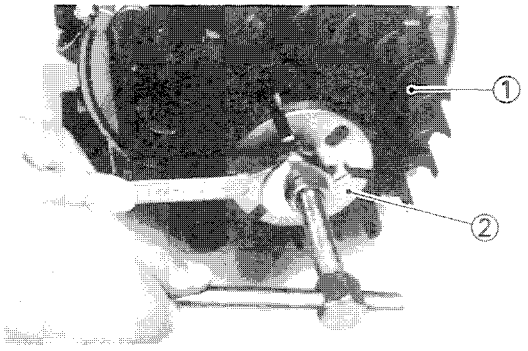
Turn the drum sheave 4 turns counterclockwise to give spring preload.

FLYWHEEL



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of Flywheel		Remove the parts in order.
	Recoil starter		Refer to the "RECOIL STARTER" section.
1	Nut	1	
2	Washer	1	
3	Starter	1	
4	Flywheel	1	
5	Key	1	
6	Screw	1	
7	Coil assembly	1	
			Reverse the removal procedure for installation.



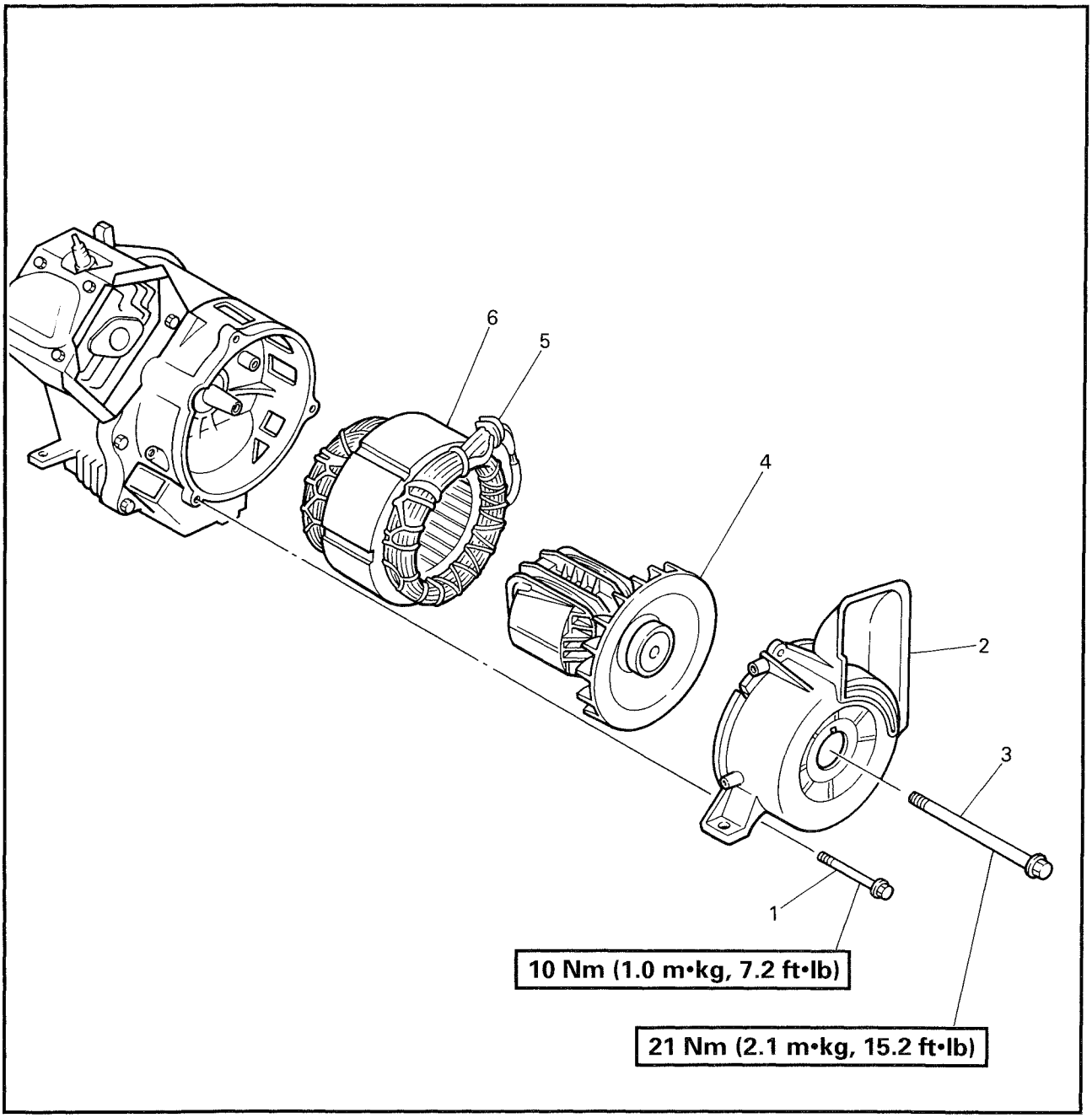
FLYWHEEL REMOVAL

1. Remove:
   - Flywheel ①

   Use a magneto puller ②.

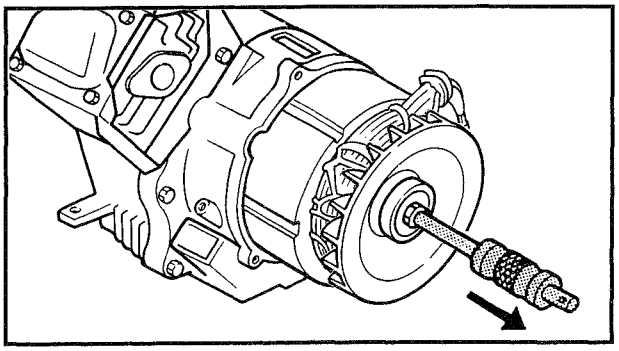
	Magneto puller: **YU-01351 (90890-01351)**

GENERATOR



JOB INSTRUCTION CHART

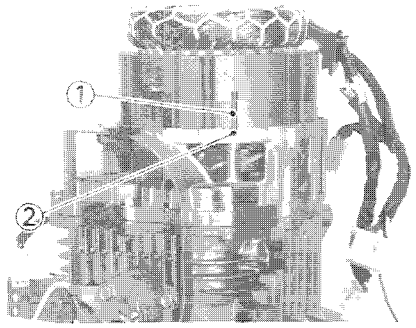
Order	Job name/Parts name	Q'ty	Remarks
	Removal of Generator		Remove the parts in order.
	Engine		Refer to "ENGINE" section.
1	Bolt	3	
2	Rear frame	1	
3	Bolt	1	
4	Rotor assembly	1	
5	Grommet	1	
6	Stator assembly	1	



ROTOR REMOVAL

1. Remove:
   - Rotor assembly

Rotor shock puller:
90890-01259
Rotor puller attachment:
90890-01349

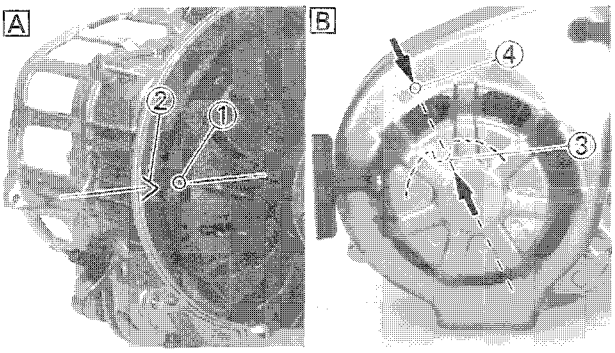


STATOR INSTALLATION

1. Install:
   - Stator assembly

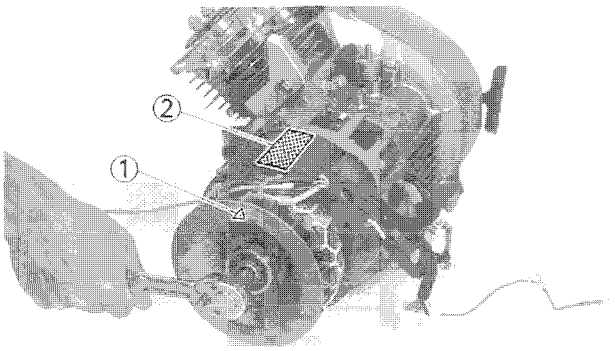
CAUTION:

Align the key ① on the stator assembly with the slot ② on the crankcase cover.



ROTOR INSTALLATION

A Align the mark ① on the flywheel magneto with the mark ② of crankcase.
B Align the cut ③ on the starter pulley with the mark ④ on the fan case.
A + B →Piston at TDC.



2. Install:
   - Rotor assembly

NOTE:

Align the mark ① on the generator fan with the shaded area ② (▨) on the piston at TDC.

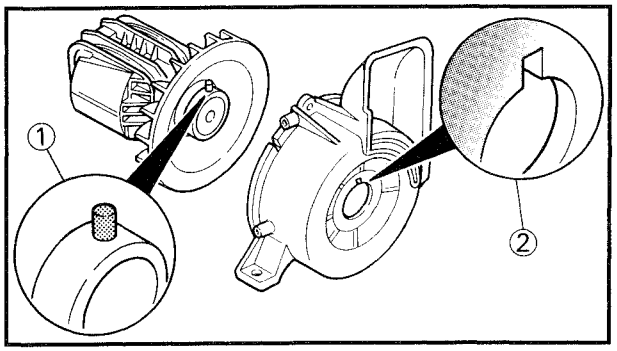
Rotor bolt
21 Nm (2.1 m•kg,15.2 ft•lb)

REAR FRAME INSTALLATION

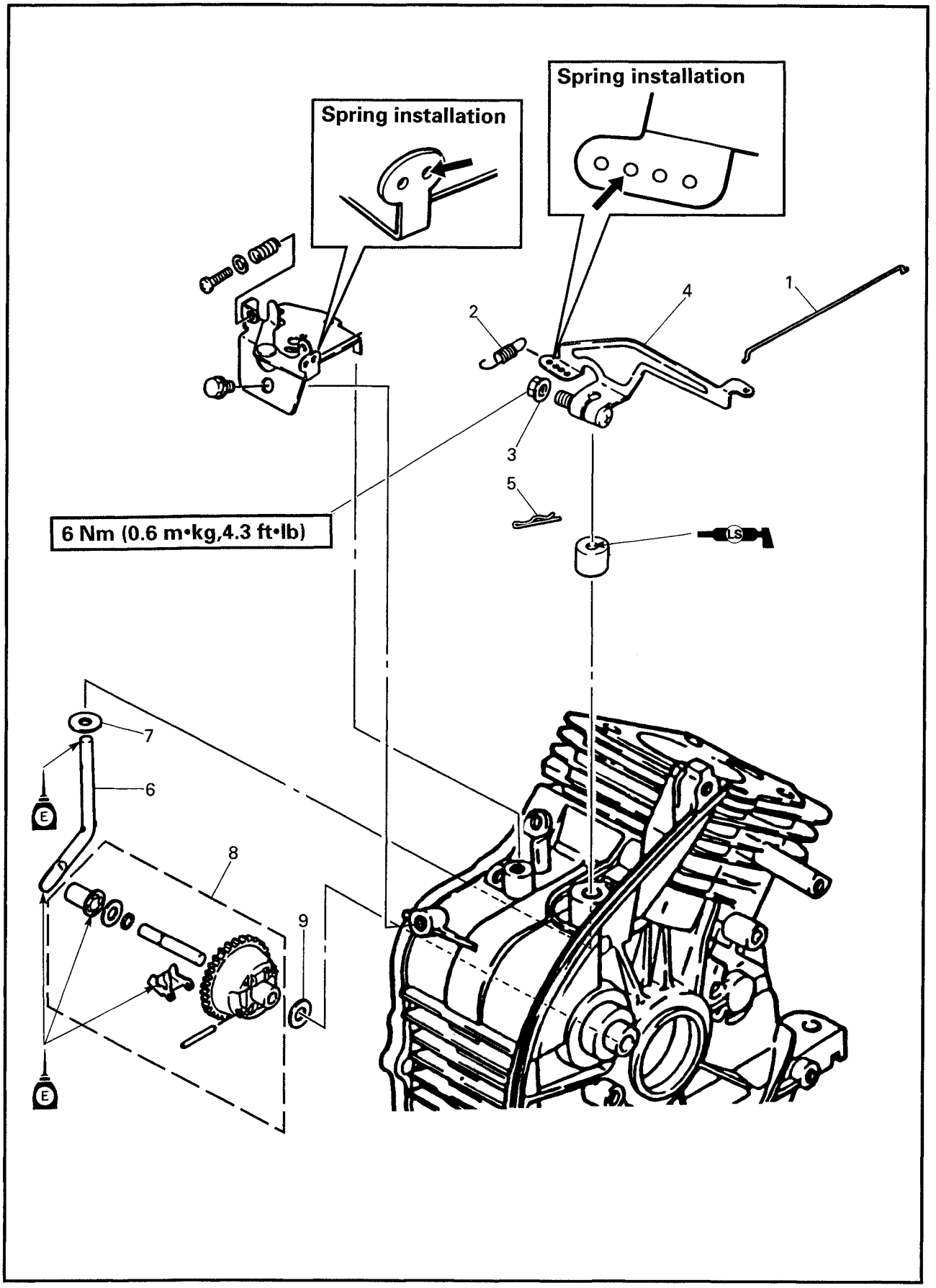
1. Install:
   - Rear frame

CAUTION:

Align the pin ① on the rotor bearing with the slot ② on the rear frame.



GOVERNOR


Spring installation
Spring installation
1
2
3
4
5
6 Nm (0.6 m•kg,4.3 ft•lb)
LS
6
7
8
9
E
E

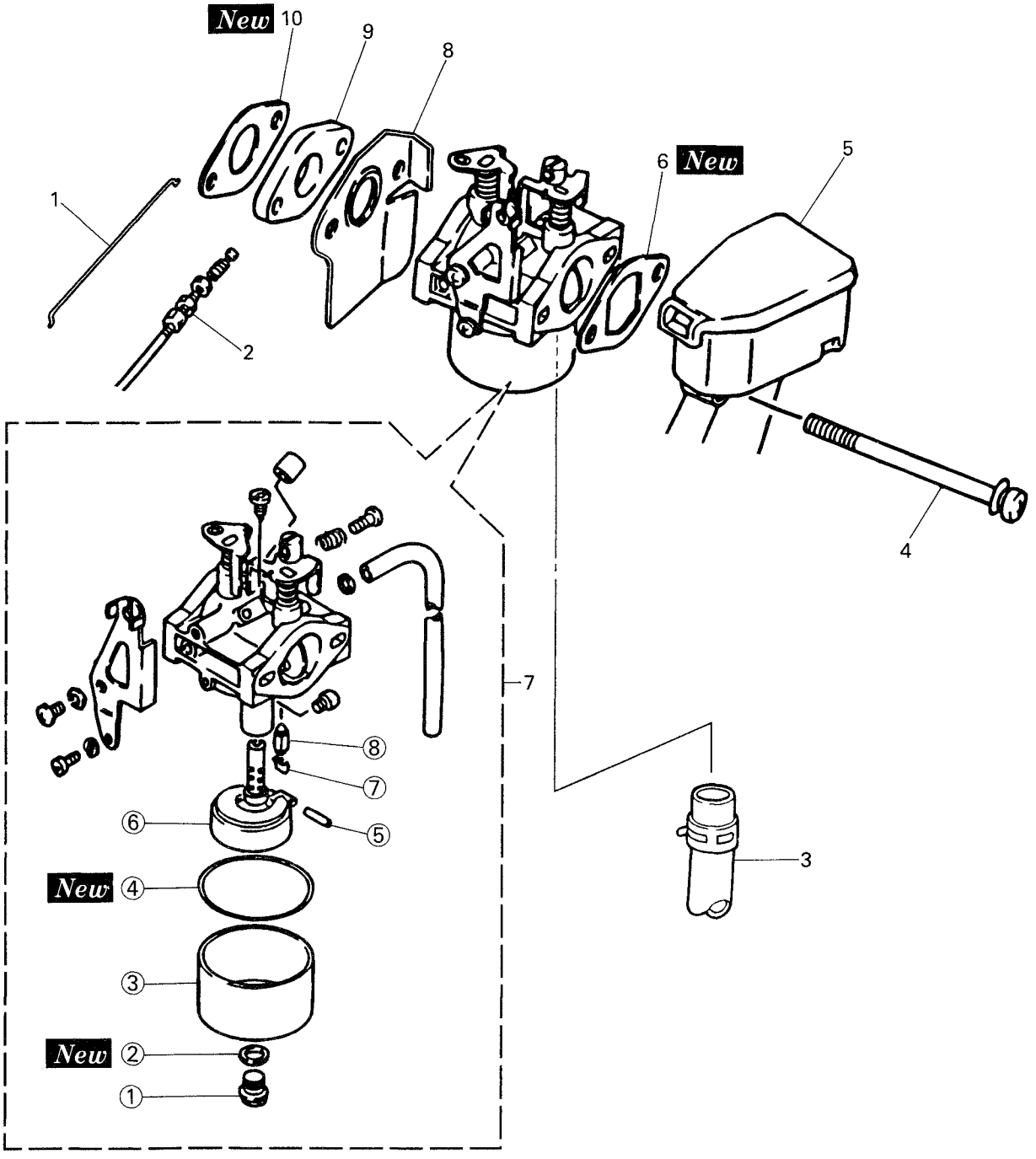
JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of Governor		Remove the parts in order.
	Generator		Refer to the "GENERATOR" section.
	Crankshaft		Refer to the "CRANKSHAFT" section.
1	Link rod	1	
2	Spring	1	
3	Nut	1	
4	Governor arm	1	
5	Clip	1	
6	Governor fork	1	
7	Washer	1	
8	Governor assmbly	1	
9	Washer	1	
			Reverse the removal procedure for installation.

1. Adjust:
   - Governor
     Refer to the "GOVERNOR ADJUSTMENT" section in CHAPTER 2.
   - Engine speed (with No Load)
     Refer to the "ENGINE SPEED ADJUSTMENT" section in CHAPTER 2.

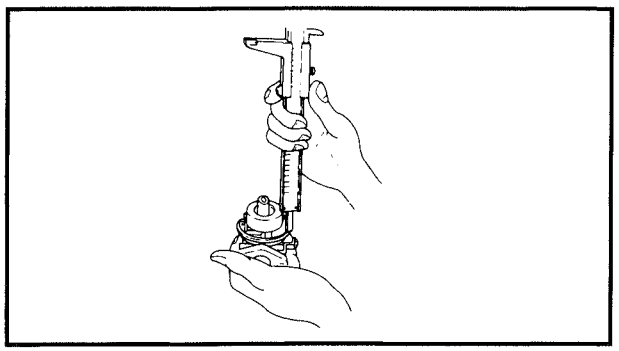
CARBURETOR

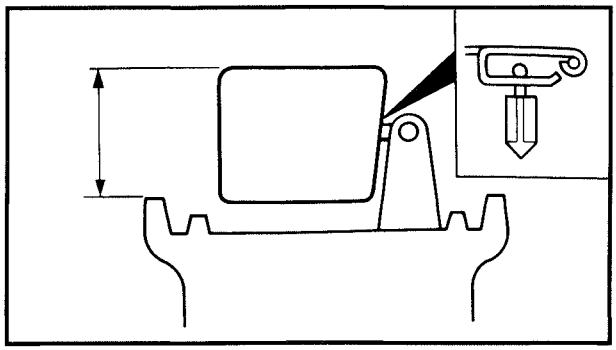
	EF1000
Type	BV15
I.D. Mark	7FL00
Float height	17 mm (0.67 in)



JOB INSTRUCTION CHART

Order	Job name/Parts name	Q'ty	Remarks
	Removal of Carburetor		Remove the parts in order.
	Body panel/Fuel tank		Refer to the "BODY PANEL/FUEL TANK" section in the CHAPTER 2.
1	Link rod	1	
2	Starter (choke) wire	1	
3	Fuel hose	1	WARNING Always clean up spilled fuel immediatey.
4	Screw	2	
5	Air filter case	1	
6	Gasket	1	
7	Carburetor assembly	1	
8	Carburetor cover	1	
9	Joint	1	
10	Gasket	1	
			Reverse the removal procedure for installation.
	Disassembly of Carburetor		
①	Bolt	1	
②	Gasket	1	
③	Float chamber	1	
④	Gasket	1	
⑤	Float pin	1	
⑥	Float	1	
⑦	Clip	1	
⑧	Needle	1	
			Reverse the disassembly procedure for assembly.





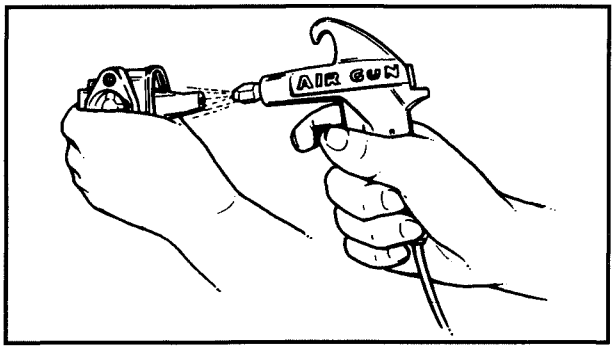
FLOAT HEIGHT INSPECTION

1. Measure:
   - Float height

NOTE:

Place the carburetor in an inverted position for measurement.
Lift up the float so that the tip of the float valve lightly contacts the float arm, and measure the float height. (This measurement should be made with the gasket removed.)

Float height:
17 mm (0.67 in)



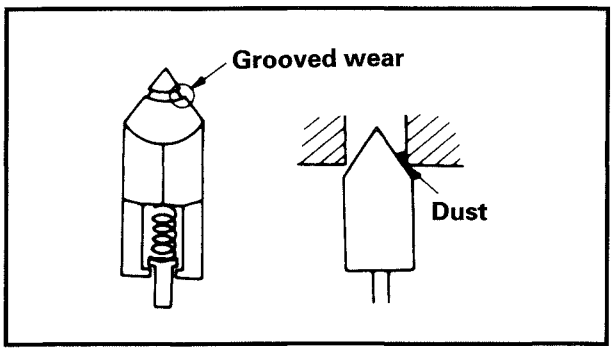
FUEL PASSAGE INSPECTION

1. Inspect:
   - Carburetor body
   - Fuel passage
     Contamination→Clean as indicated.

Carburetor cleaning steps:
- Wash carburetor in petroleum based solvent. (Do not use any caustic carburetor cleaning solution.)
- Blow out all passages and jets with compressed air.

CAUTION:

Never use a wire.



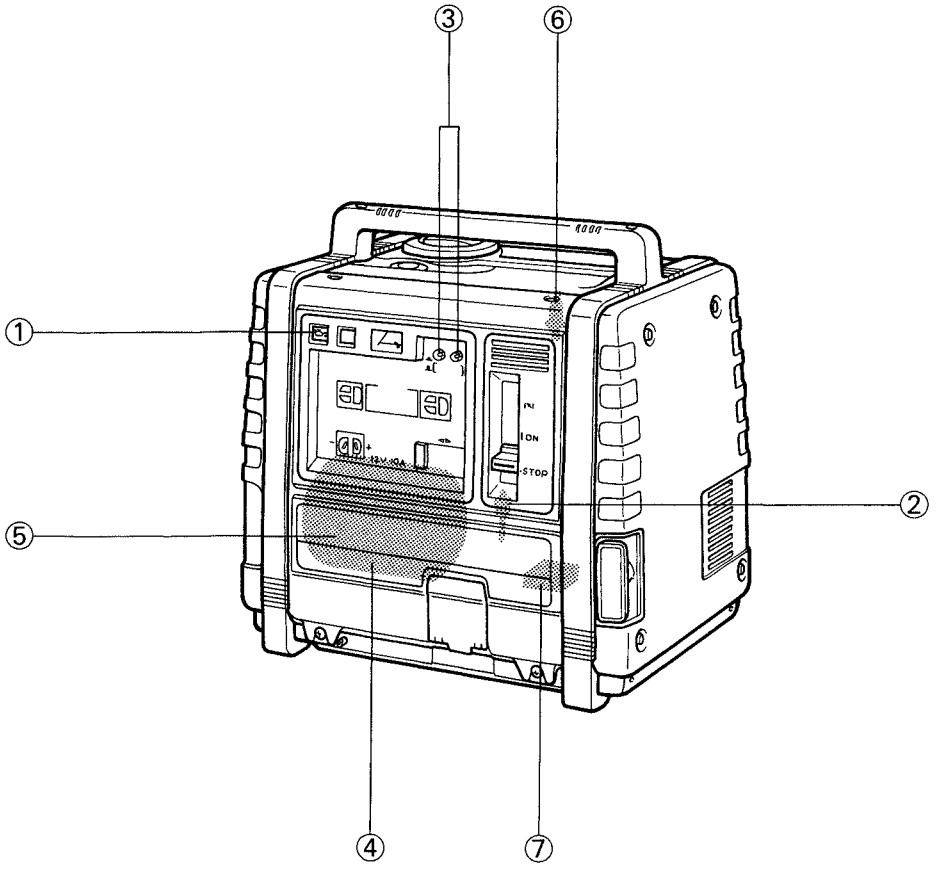
VALVE SEAT INSPECTION

1. Inspect:
   - Valve seat
     Damage/Wear→Replace.
     Contamination→Clean.

ELECTRICAL

ELECTRICAL COMPONENTS

① Oil pilot light
② Engine stop switch
③ Circuit protecter(s)
④ Stator assembly
⑤ Rotor assembly
⑥ Spark plug
⑦ C.D.I. unit

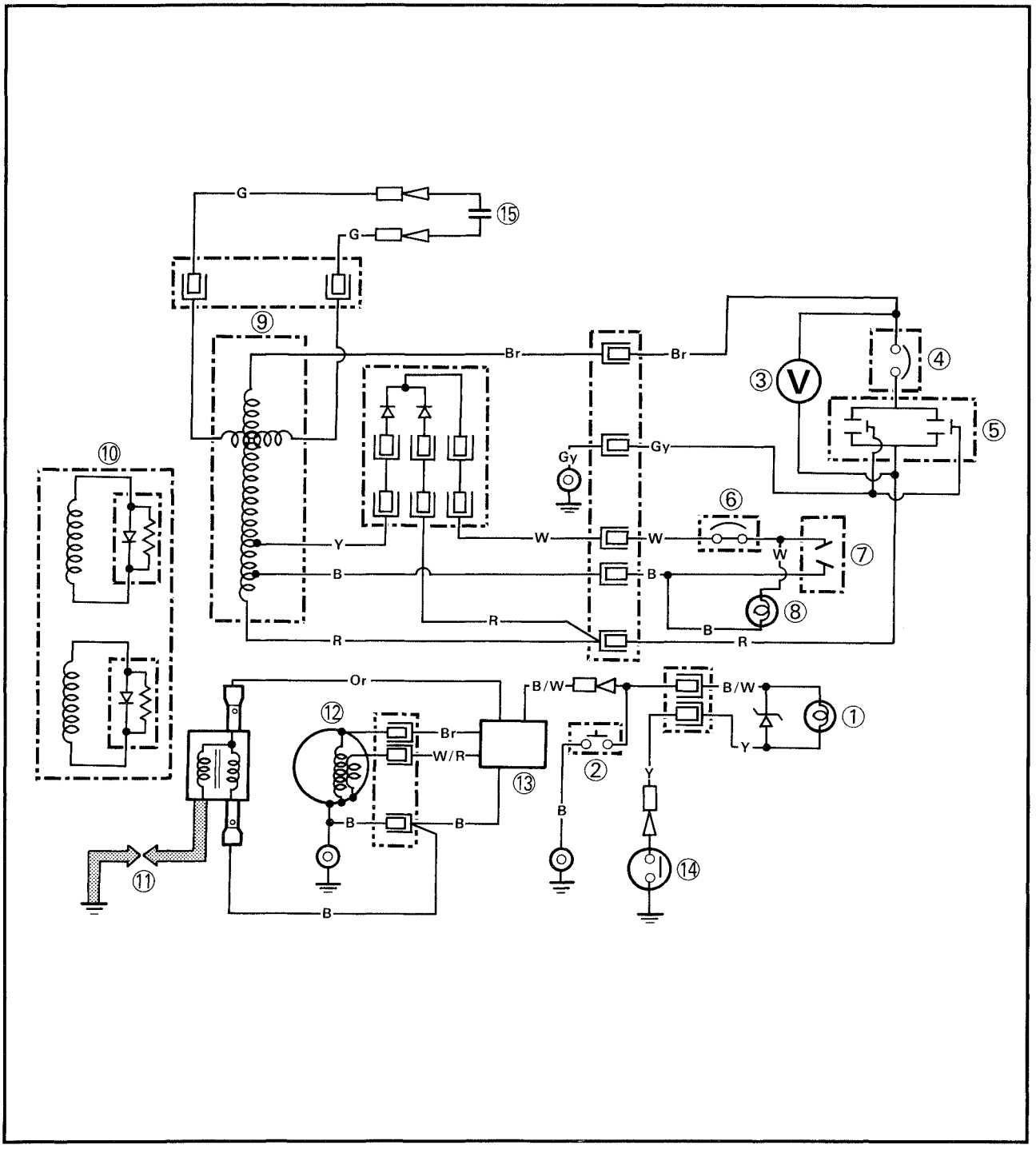


CIRCUIT DIAGRAM (120V 60Hz)

① Oil light
② Engine stop switch
③ Voltage meter
④ AC protector
⑤ AC receptacle
⑥ DC protecter
⑦ DC receptacle
⑧ Pilot lamp
⑨ Stator assembly
⑩ Rotor assembly
⑪ Spark plug
⑫ C.D.I. magneto
⑬ C.D.I. unit
⑭ Oil level gauge
⑮ Condenser

COLOR CODE

B.....Black
Br.....Brown
G.....Green
Gy.....Gray
Or.....Orange
R.....Red
W.....White
B/W.....Black/White
W/R.....White/Red
Y.....Yellow



TROUBLESHOOTING CHART

NO SPARK OR WEAK SPARK

NOTE:

- Remove the following parts before troubleshooting.
  1) Spark plug
- Use the following special tool(s) in this troubleshooting.

Pocket tester: YU-03112(90890-03112)	**Dynamic spark tester (Ignition Checker):** YM-34487(90890-06754)

1. Spark plug

- Check the spark plug condition. Refer to the "SPARK PLUG" section in the CHAPTER 2.

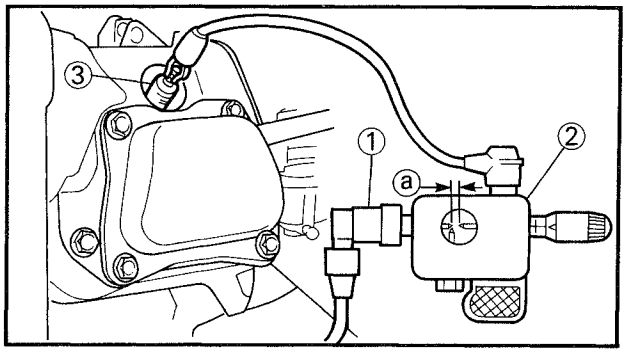
INCORRECT → Repair or replace spark plug.

CORRECT ↓

2. Ignition spark gap

- Disconnect the spark plug cap ① from spark plug.
- Connect the ignition checker ② as shown.

Spark plug cap ①→ Ignition checker
Ignition checker lead→ Spark plug ③



- Turn the crank and measure the ignition spark gap ⓐ.

Minimum spark gap:
6 mm (0.24 in)

MEET SPECIFICATION → Ignition system is good.

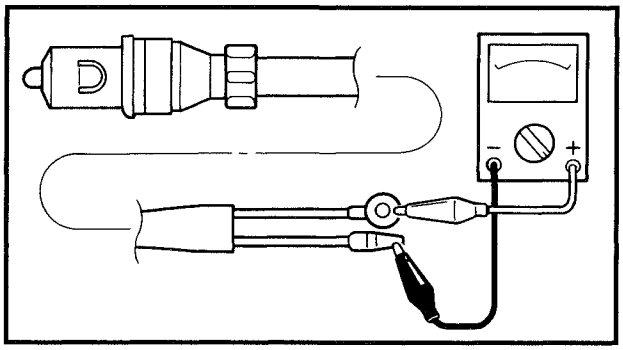
OUT OF SPECIFICATION OR NO SPARK ↓

*

*

3. Engine stop switch

- Disconnect the engine stop switch leads.
- Connect the pocket tester (Ω×1) to the engine stop switch.
- Do not push the engine stop switch; Check the engine stop switch for continuity.



CONTINUITY

NO CONTINUITY

- Push the engine stop switch: Check the engine stop switch for continuity.

NO CONTINUITY

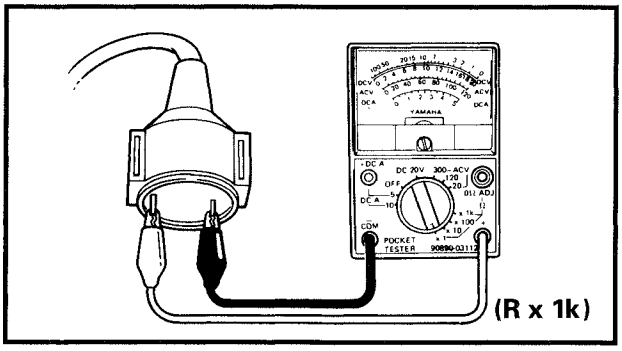
Replace engine stop switch.

CONTINUITY

4. Ignition coil resistance (Primary)

- Remove the ignition coil.
- Connect the pocket tester as shown.

Ignition coil resistance (Primary): 0.23Ω±10%



OUT OF SPECIFICATION

MEET SPECIFICATION

Replace ignition coil assembly.

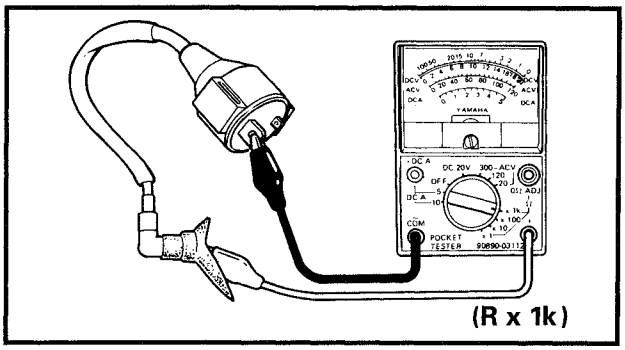
*

*

5. Ignition coil resistance (Secondary)

- Remove the ignition coil.
- Connect the pocket tester as shown.

Ignition coil resistance (Secondary):
5.61 kΩ±20%



OUT OF SPECIFICATION

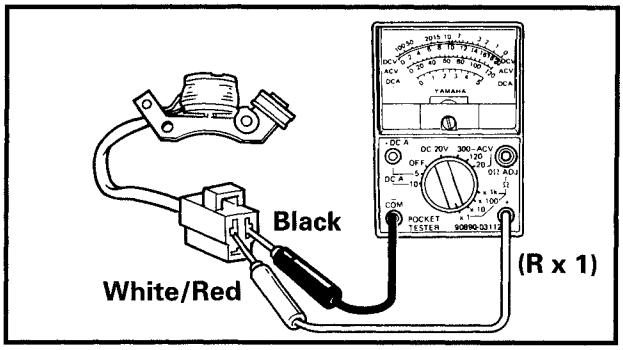
Replace ignition coil assembly.

MEET SPECIFICATION

6. C.D.I. coil resistance (Pulser)

- Disconnect the C.D.I. coupler.
- Connect the pocket tester as shown.

C.D.I. coil resistance (Pulser):
38Ω±10%



OUT OF SPECIFICATION

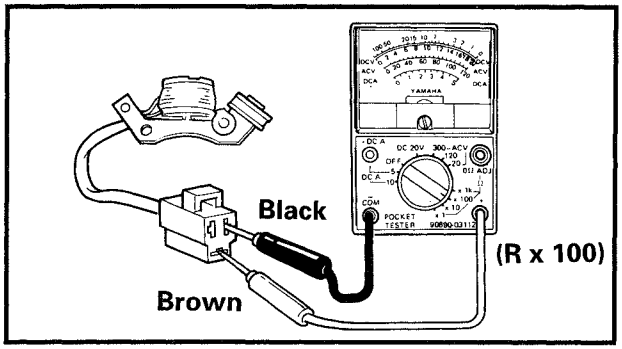
Replace C.D.I. coil assembly.

MEET SPECIFICATION

7. C.D.I. coil resistance (Charge)

- Disconnect the C.D.I. coupler.
- Connect the pocket tester as shown.

C.D.I. coil resistance (Charge):
350Ω±10%



OUT OF SPECIFICATION

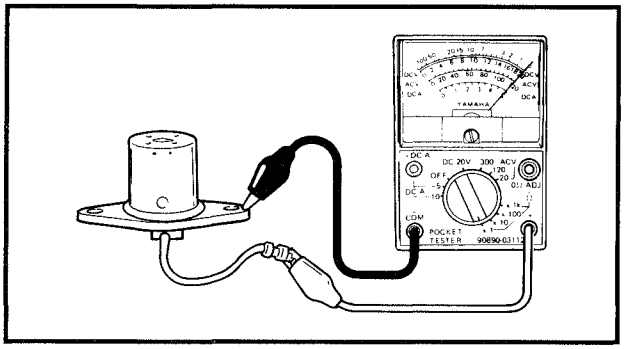
MEET SPECIFICATION

Replace C.D.I. coil assembly.

*

8. Oil level gauge

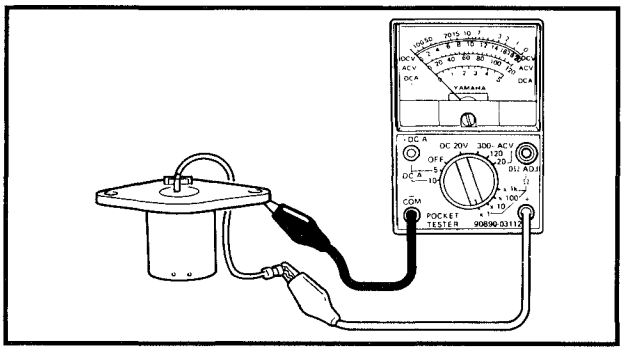
- Drain the engine oil.
  Refer to the "ENGINE OIL" section in CHAPTER 2.
- Remove the oil level gauge.
- Connect the pocket tester as shown.



CONTINUITY

Replace oil level gauge.

NO CONTINUITY



NO CONTINUITY

- Overturn the oil level gauge as shown.

Replace oil level gauge.

CONTINUITY

- Tighten the oil level gauge bolts.

7 Nm (0.7 m • kg, 5.1 ft • lb)

9. Wiring connecting

- Check the entire ignition system for connections.

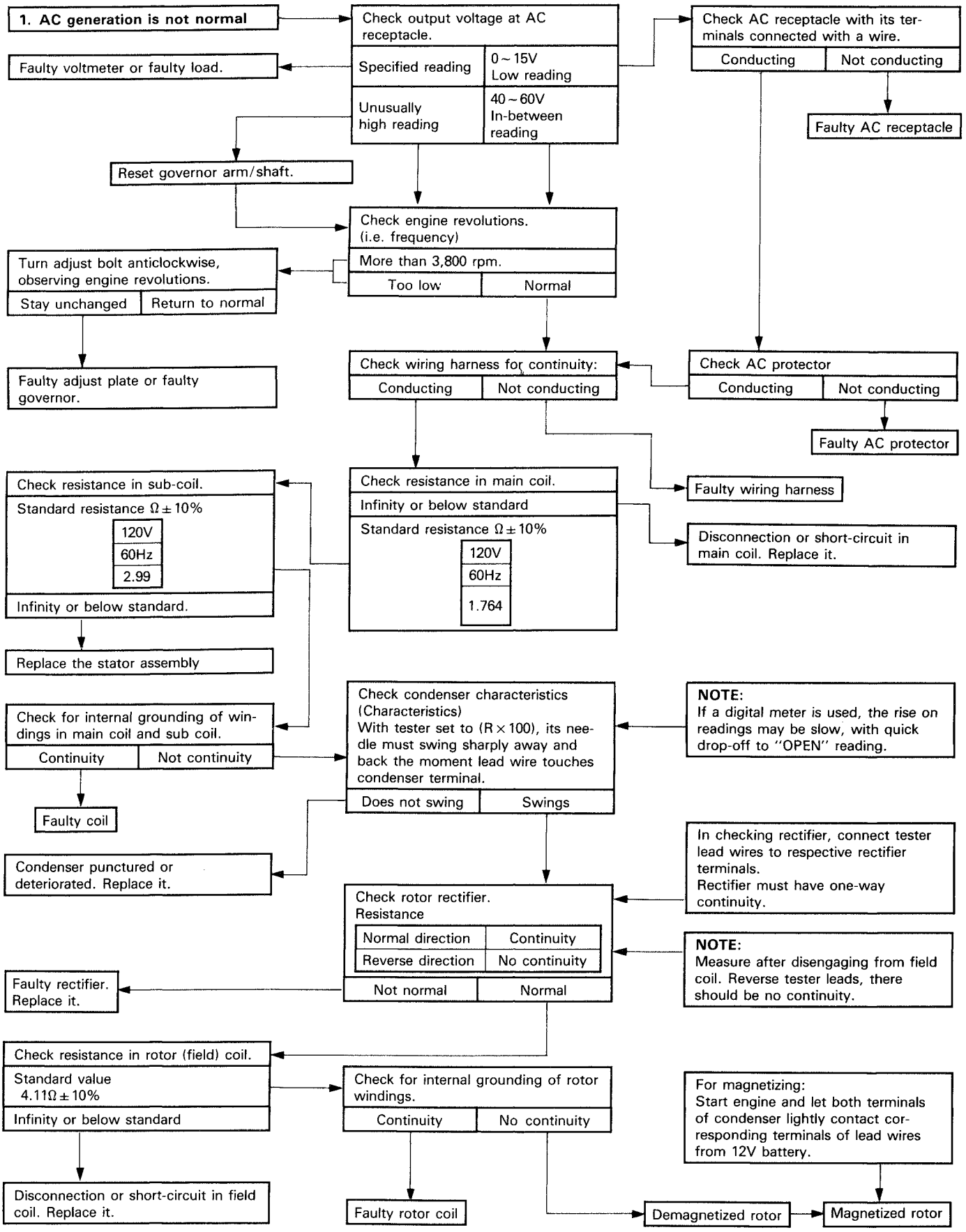
POOR CONNECTION

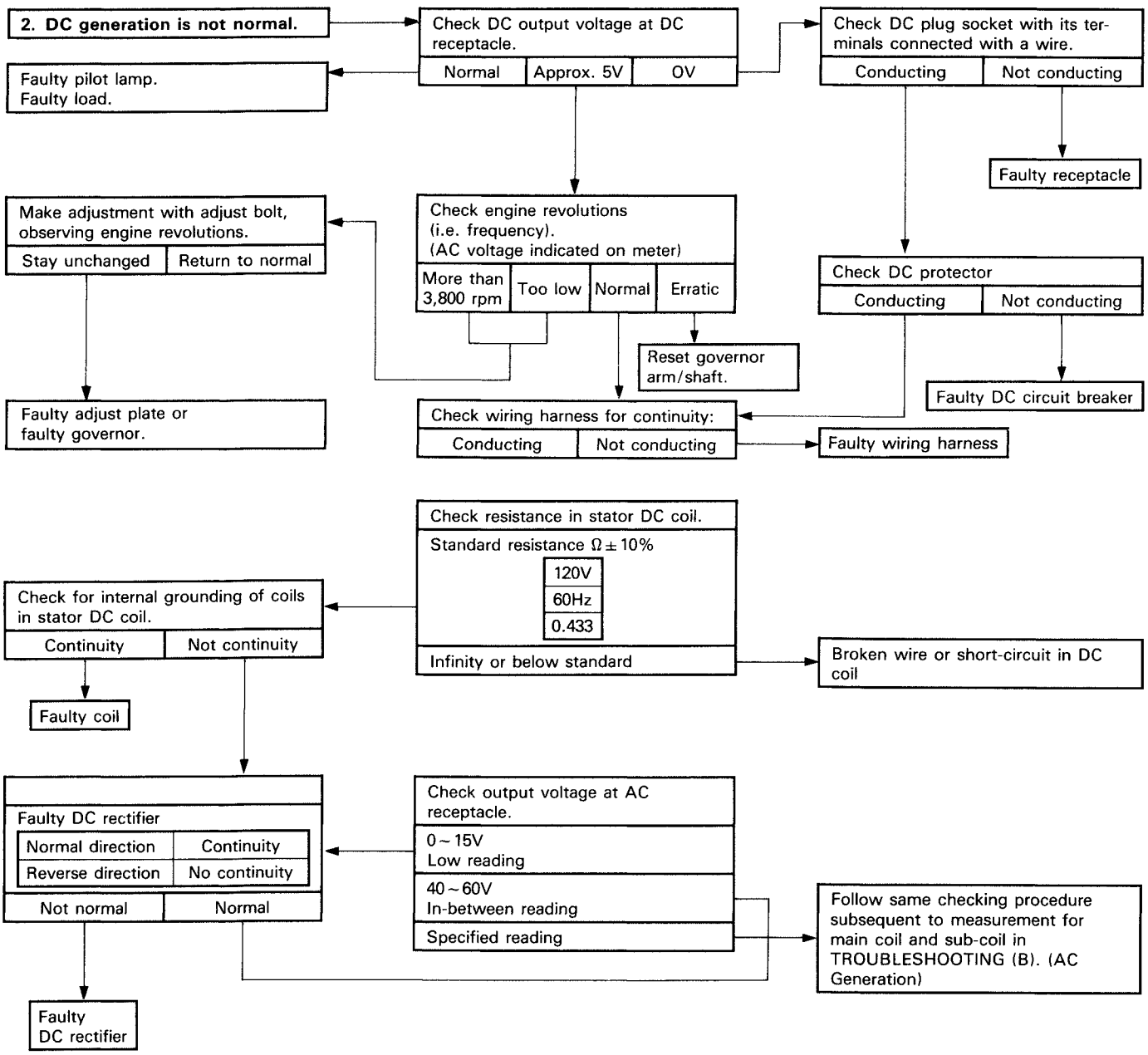
Correct.

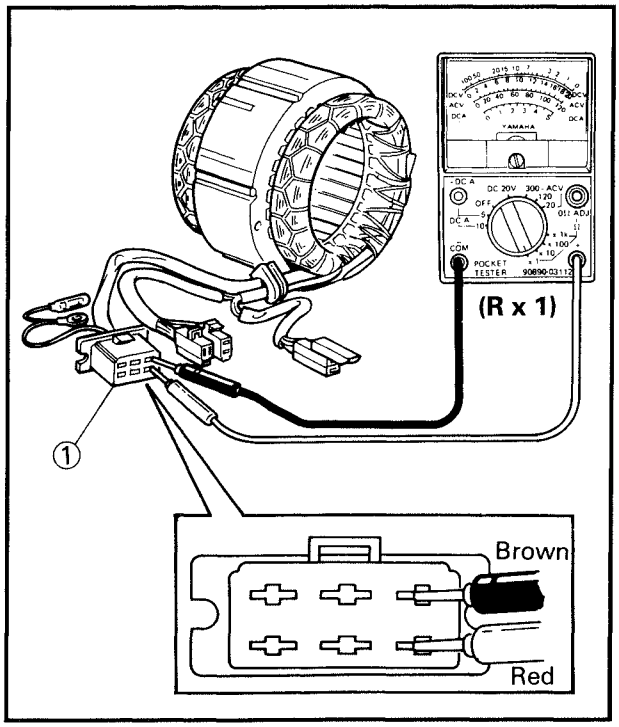
CORRECT

Replace flywheel.

TROUBLESHOOTING


1. AC generation is not normal
Check output voltage at AC receptacle.
Specified reading
0 ~ 15V Low reading
Unusually high reading
40 ~ 60V In-between reading
Faulty voltmeter or faulty load.
Reset governor arm/shaft.
Check AC receptacle with its terminals connected with a wire.
Conducting
Not conducting
Faulty AC receptacle
Check engine revolutions. (i.e. frequency)
More than 3,800 rpm.
Too low
Normal
Turn adjust bolt anticlockwise, observing engine revolutions.
Stay unchanged
Return to normal
Faulty adjust plate or faulty governor.
Check wiring harness for continuity:
Conducting
Not conducting
Check AC protector
Conducting
Not conducting
Faulty AC protector
Faulty wiring harness
Check resistance in sub-coil.
Standard resistance Ω ± 10%
120V
60Hz
2.99
Infinity or below standard.
Replace the stator assembly
Check resistance in main coil.
Infinity or below standard
Standard resistance Ω ± 10%
120V
60Hz
1.764
Disconnection or short-circuit in main coil. Replace it.
Check for internal grounding of windings in main coil and sub coil.
Continuity
Not continuity
Faulty coil
Check condenser characteristics (Characteristics)
With tester set to (R × 100), its needle must swing sharply away and back the moment lead wire touches condenser terminal.
Does not swing
Swings
NOTE:
If a digital meter is used, the rise on readings may be slow, with quick drop-off to "OPEN" reading.
Condenser punctured or deteriorated. Replace it.
Check rotor rectifier.
Resistance
Normal direction
Continuity
Reverse direction
No continuity
Not normal
Normal
In checking rectifier, connect tester lead wires to respective rectifier terminals.
Rectifier must have one-way continuity.
NOTE:
Measure after disengaging from field coil. Reverse tester leads, there should be no continuity.
Faulty rectifier. Replace it.
Check resistance in rotor (field) coil.
Standard value 4.11Ω ± 10%
Infinity or below standard
Disconnection or short-circuit in field coil. Replace it.
Check for internal grounding of rotor windings.
Continuity
No continuity
Faulty rotor coil
For magnetizing:
Start engine and let both terminals of condenser lightly contact corresponding terminals of lead wires from 12V battery.
Demagnetized rotor
Magnetized rotor


2. DC generation is not normal.
Check DC output voltage at DC receptacle.
Normal
Approx. 5V
0V
Faulty pilot lamp.
Faulty load.
Check DC plug socket with its terminals connected with a wire.
Conducting
Not conducting
Faulty receptacle
Check engine revolutions (i.e. frequency). (AC voltage indicated on meter)
More than 3,800 rpm
Too low
Normal
Erratic
Make adjustment with adjust bolt, observing engine revolutions.
Stay unchanged
Return to normal
Reset governor arm/shaft.
Check DC protector
Conducting
Not conducting
Faulty DC circuit breaker
Faulty adjust plate or faulty governor.
Check wiring harness for continuity:
Conducting
Not conducting
Faulty wiring harness
Check resistance in stator DC coil.
Standard resistance Ω ± 10%
120V
60Hz
0.433
Infinity or below standard
Broken wire or short-circuit in DC coil
Check for internal grounding of coils in stator DC coil.
Continuity
Not continuity
Faulty coil
Faulty DC rectifier
Normal direction
Continuity
Reverse direction
No continuity
Not normal
Normal
Faulty DC rectifier
Check output voltage at AC receptacle.
0 ~ 15V
Low reading
40 ~ 60V
In-between reading
Specified reading
Follow same checking procedure subsequent to measurement for main coil and sub-coil in TROUBLESHOOTING (B). (AC Generation)



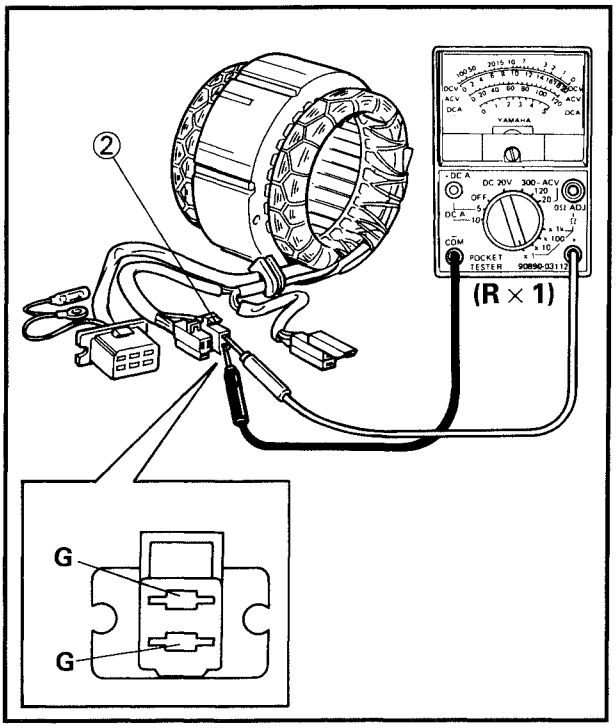
INSPECTION

Main coil resistance

1. Disconnect the main coil coupler ①.
2. Connect the pocket tester as shown.

Main coil resistance:
1.764Ω±10%

Out or specification→Replace stator assembly.

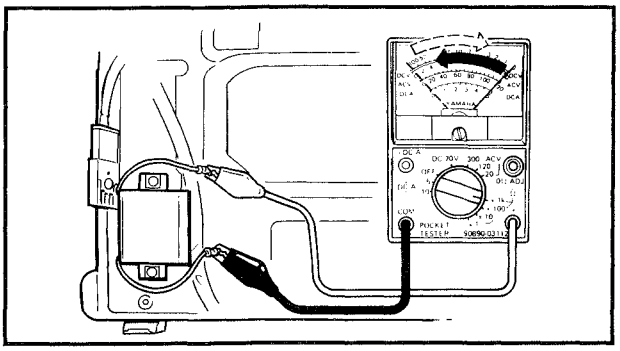


Sub coil resistance

1. Disconnect the sub coil coupler ①.
2. Connect the pocket tester as shown.

Sub coil resistance:
2.99Ω±10%

Out or specification→Replace stator assembly.



Condenser functions

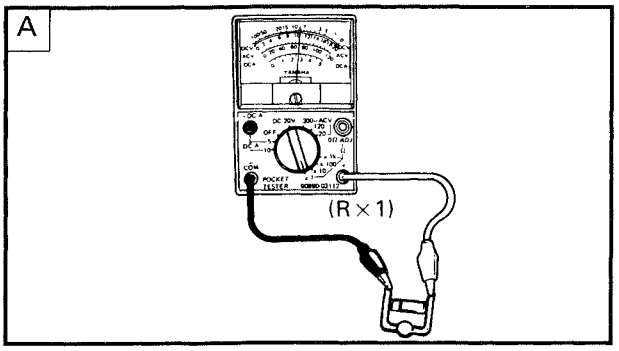
1. Disconnect the condenser leads.
2. Connect the pocket tester.
   Turn the pocket tester switch to "R×1K" from "OFF" position.

Needle swings and returns back quickly→ Correct.
Needle does not swing/return→Replace.

⚠WARNING

Discharge the old condenser by shorting the two terminals together.
Use an Insulated screw driver.
Do not touch either of the terminals and ground before the condenser is discharged.

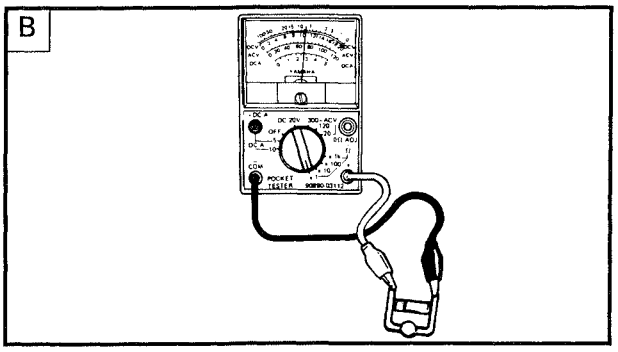
A



Rotor rectifier continuitys

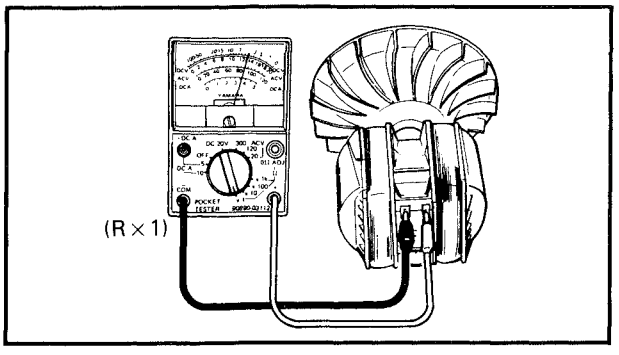
1. Desolder the rotor rectifiers.
2. Connect the pocket tester shown.
   Continuity→Correct.
   No continuity→Replace.

B



3. Connect the pocket tester as shown.
   No continuity→Correct.
   Continuity→Replace.

[A]: Nomal direction.
[B]: Reverse direction.

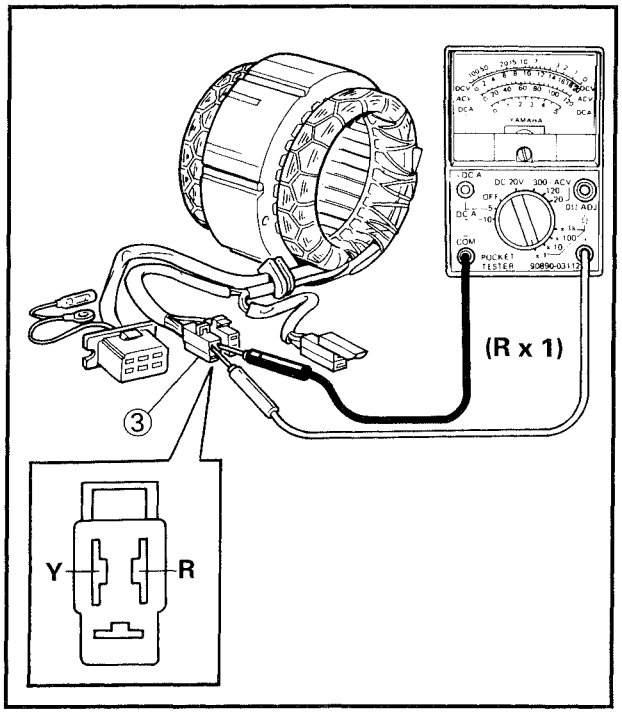


Rotor resistance

1. Desolder the rotor rectifiers.
2. Connect the pocket tester as shown.

	Rotor resistance: **4.11Ω±10%**

Out of specification→Replace.

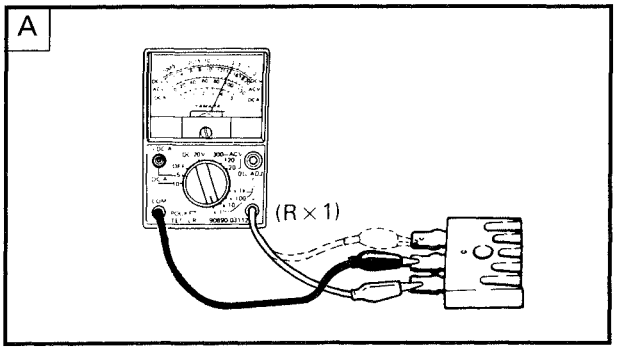


DC coil resistance

1. Disconnect the DC coil coupler ①.
2. Connect the pocket tester as shown.

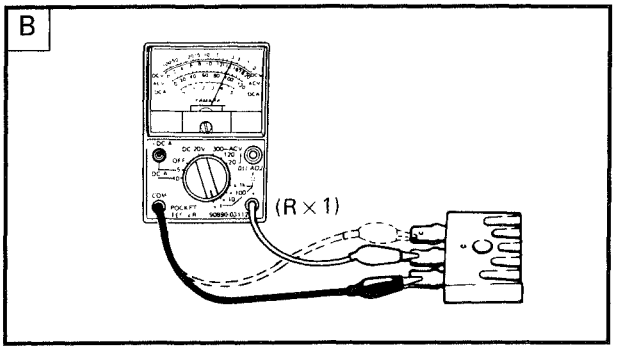
	DC coil resistance: **0.433Ω±10%**

Out of specification→Replace stator assembly.



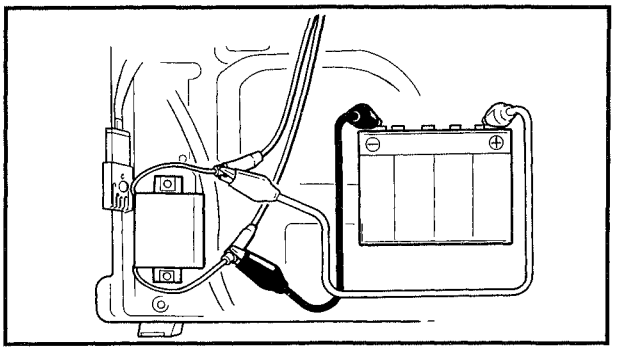
DC rectifier continuitys

1. Remove the DC rectifier.
2. Connect the pocket tester as shown.
   Continuity→Correct.
   No continuity→Replace DC rectifier.



3. Connect the pocket tester as shown.
   No continuity→Correct.
   Continuity→Replace DC rectifier.

[A]: Normal direction.
[B]: Reverse direction.



Rotor remagnetized

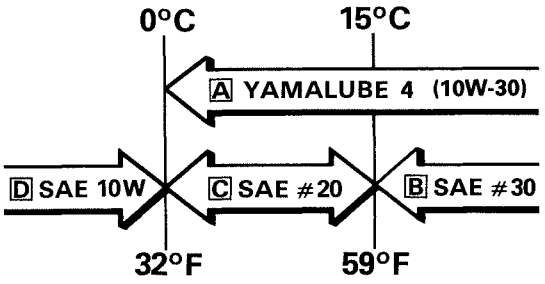
1. Assembl the generator.
2. Start and turn the engine with no load.
3. Connect the battery (12V) to the condenser terminal at the moment and the rotor will be magnetized instantly.

CAUTION:

Do not connect the battery more than a few seconds. This may cause deteriorate the battery.

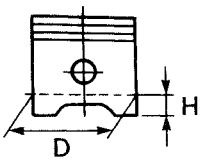
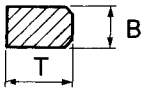
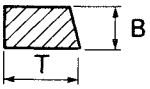
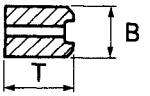
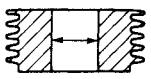
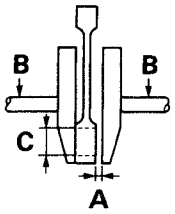
SPECIFICATIONS

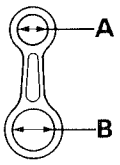
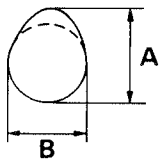
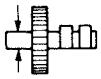
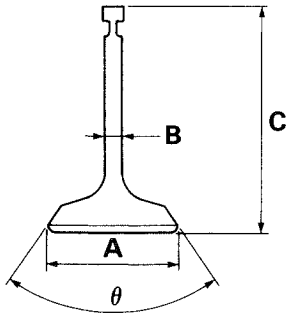
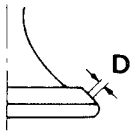
GENERAL SPECIFICATIONS

	Unit	EF1000
MODEL CODE NUMBER		7FL
DIMENSIONS		
Overall Length	mm (in)	390 (15.4)
Overall Width	mm (in)	280 (11.0)
Overall Height	mm (in)	388 (15.3)
Dry Weight	kg (lb)	24.8 (54.7)
ENGINE		
Engine Type		4-stroke OHV forced air cooled
Cylinder Arrangement		1
Displacement	cm^3	84.4
Bore × Stroke	mm (in)	50 × 43 (1.97 × 1.69)
Compression Ratio		8.0 : 1
Operating Hours		5.0
Fuel		Unleaded regular gasoline
Fuel Tank Capacity	L (Imp gal, US gal)	3.8 (0.84, 1.0)
Engine Oil Capacity	L (Imp qt, US qt)	0.43 (0.38, 0.45)
Engine Oil Grade		4-stroke engine oil API Service Classification SE or SF if not available, SD 
IGNITION SYSTEM		C.D.I.
Ignition Timing		BTDC 23°
Spark Plug Type		BPR6HS
Gap	mm (in)	0.6~0.7 (0.024~0.028)
GENERATOR		
AC Output		
Rated Voltage	V	120
Frequency	Hz	60
Rated Output	kVA	0.85
Rated Current	A	7.1
Safety Device Against		Protector (Thermal type)
DC Output		
Rated Voltage	V	12
Rated Current	A	10
Safty DevicemAgainst		Protector

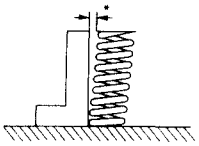
MAINTENANCE SPECIFICATIONS

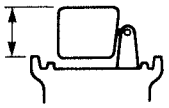
Engine

	Unit	EF1000
PISTON	mm (in)	
Piston Clearance		0.020~0.035 (0.0008~0.0014)
Piston Size "D"		50.0 (1.969)
<Limit>		49.93 (1.966)
Mesuring Point "H"		10 (0.4)
PISTON PIN	mm (in)	
Piston Pin Dia		12.0 (0.47)
<Limit>		11.9 (0.468)
PISTON RING	mm (in)	
Top Ring		
Dimensions		1.5 × 2.0 (0.059 × 0.079)
End Gap		0.1~0.25 (0.004~0.01)
<Limit>		0.9 (0.035)
Side Clearance		0.06 (0.0024)
<Limit>		0.15 (0.006)
2nd Ring		
Dimensions		1.5 × 2.0 (0.059 × 0.079)
End Gap		0.1~0.25 (0.004~0.01)
<Limit>		0.9 (0.035)
Side Clearance		0.04 (0.0016)
<Limit>		0.15 (0.006)
Oil Ring		
Dimensions		2.5 × 2.1 (0.098 × 0.083)
End Gap		0.1~0.25 (0.004~0.01)
<Limit>		0.9 (0.0354)
CYLINDER HEAD	mm (in)	
Warp Limit		0.5 (0.02)
CYLINDER	mm (in)	
Bore Size		50.0 (1.969)
CRANKSHAFT	mm (in)	
		
Big End Side Clearance "A"		0.2~0.6 (0.008~0.024)
Runout <Limit> "B"		0.02 (0.0008)
Crank Pin Dia "C"		22.0 (0.87)
<Limit>		21.9 (0.86)

	Unit	EF1000
CONNECTING ROD	mm (in)	
Small End Dia "A"		12.0
Big End Dia "B"		22.0
Oil Clearance		0.016~0.034 (0.0006~0.0013)
<Limit>		0.1 (0.004)
CAMSHAFT	mm (in)	
Camshaft Outside Dia		
Cam Dimension		
"A"		IN: 20.5 (0.81) / EX: 20.5 (0.81)
"B"		IN: 16.0 (0.63) / EX: 16.0 (0.63)
Camshaft Journal		12.0 (0.472)
<Limit>		11.9 (0.468)
VALVE	mm (in)	
Valve Dimension	 	
Head Dia "A"	IN	19.0 (0.75)
	EX	17.0 (0.67)
Stem Dia "B"	IN	5.0 (0.2)
	EX	5.0 (0.2)
Length "C"	IN	53.4 (2.10)
	EX	53.6 (2.11)
Seat Width "D"	IN	0.7 (0.03)
	EX	0.7 (0.03)
<Limit>		1.2 (0.047)
"θ"		90°
Valve Clearance (Cold)	IN	0.1 (0.004)
	EX	0.1 (0.004)
PUSH ROD	mm (in)	
Runout Limit		0.5 (0.02)

	Unit	EF1000
VALVE SPRING	mm (in)	
Free Length		27.4 (1.08)
<Limit>		24.4 (0.96)
Tilt Limit		0.8 (0.031)
CARBURETOR	mm (in)	
Type/Manufacturer		BV15/MIKUNI
Bore Size		15 (0.6)
Float Height		17 (0.67)





Generator, Electrical

	Unit	EF1000
GENERATOR		
Type		Bruse-less, Condenser-exciting, AC generator
Phase		Single
Number of Poles		2
Excitation		Self magnetization
Initial Excitation		Residual magnetization
Driving Method		Direct connection
Rated Power Factor		1.0
Frequency Fluctuation		Less than 5%
ELECTRIC		
Ignition System		C.D.I.
Pulser coil resistance (±10%)		38 Ω
Charge coil resistance (±10%)		350 Ω
Ignition timing		BTDC 23°/3,000~3,600 r/min
Primary coil resistance (±10%)		0.23 Ω
Secondary coil resistance (±20%)		5.61 kΩ
AC excess current check		Protector
DC excess current check		Ptorector
Coil resistance (Ω±10%)		
Main coil at 20°C		1.764
Sub coil at 20°C		2.99
DC coil at 20°C		0.433
Rotor coil at 20°C		4.11
Number of rectifier		1
Rotor rectifier resistance		
Normal direction		Continuity
Reverse direction		No continuity (infinite)

TIGHTENING TORQUE

Model / Item	EF1000	
	Thread size	Torque Nm (m•kg, ft•lb)
Cylinder head	M 6 × 1.0	11 (1.1, 8.0)
Cylinder head cover	M 6 × 1.0	10 (1.0, 7.2)
Crankcase cover	M 6 × 1.0	10 (1.0, 7.2)
Spark plug	M14 × 1.25	20 (2.0, 14.5)
Fan case	M 6 × 1.0	7 (0.7, 5.1)
Connecting rod	M 6 × 1.0	9 (0.9, 6.5)
Flywheel magneto	M12 × 1.25	40 (4.0, 29)
Governor arm	M 6 × 1.0	6 (0.6, 4.3)
Fuel cock	M 6 × 1.0	4 (0.4, 2.9)
Rotor ass'y	M 8 × 1.25	21 (2.1, 15.2)
Stator ass'y	M 6 × 1.0	10 (1.0, 7.2)
Rocker arm lock nut	M 6 × 0.5	10 (1.0, 7.2)
Muffler nut	M 6 × 1.0	7 (0.7, 5.1)

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multifastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

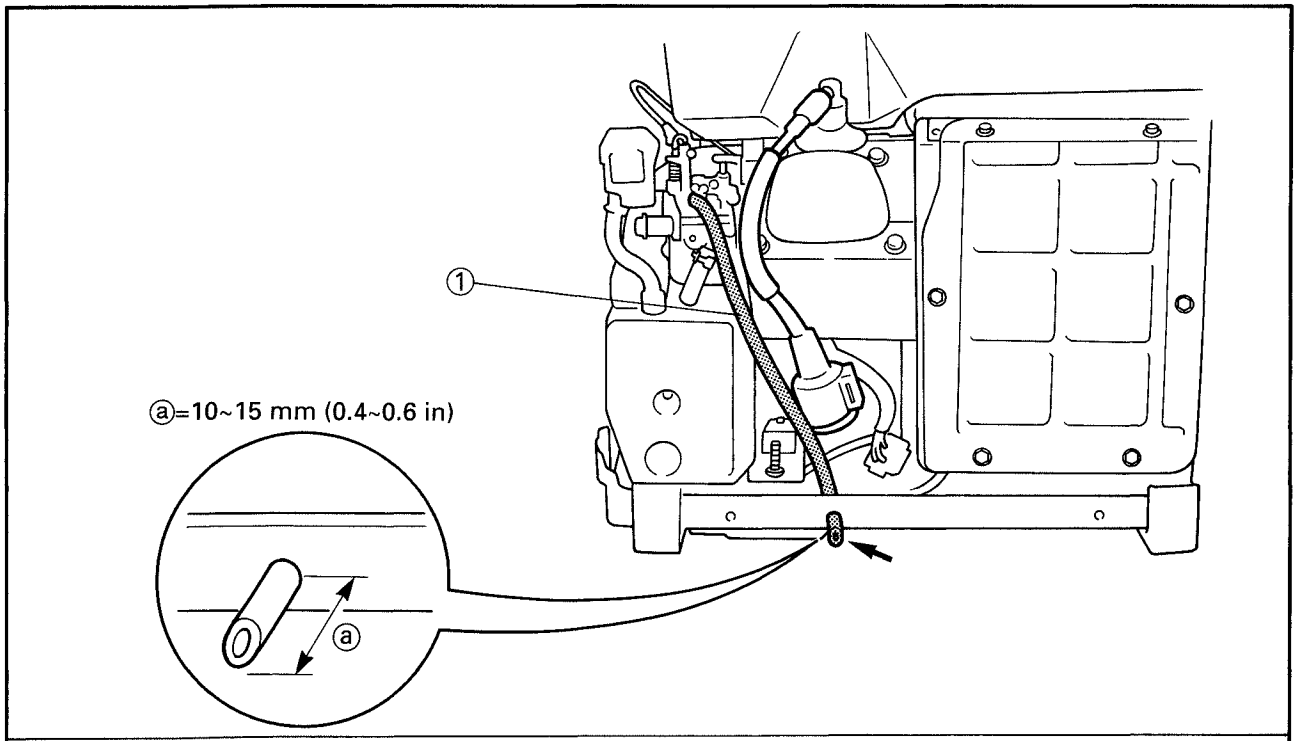
Thread size	Tightening torque		
	Nm	m • kg	ft • lb
M 4	2	0.2	1.4
M 5	3	0.3	2.2
M 6	7	0.7	5.1
M 7	10	1.0	7.2
M 8	15	1.5	10.8
M10	30	3.0	21.7
M12	60	6.0	43.4

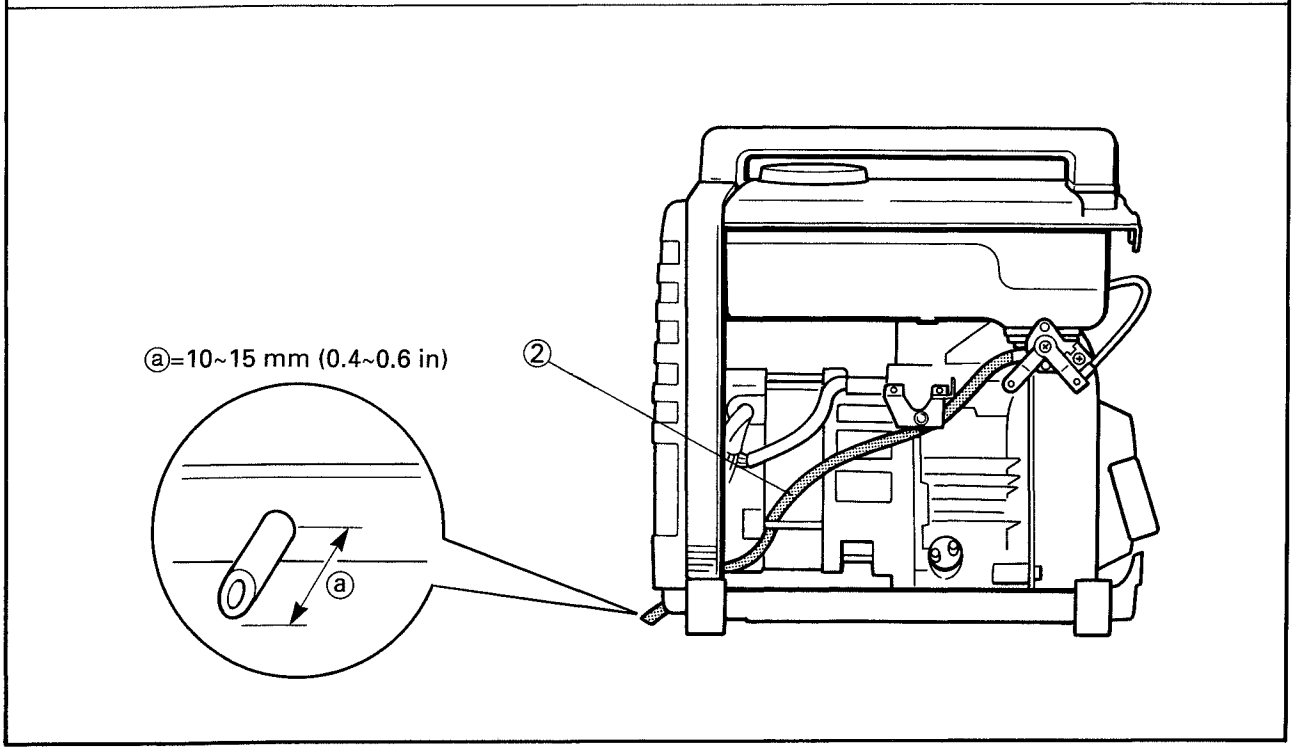
DEFINITION OF UNITS

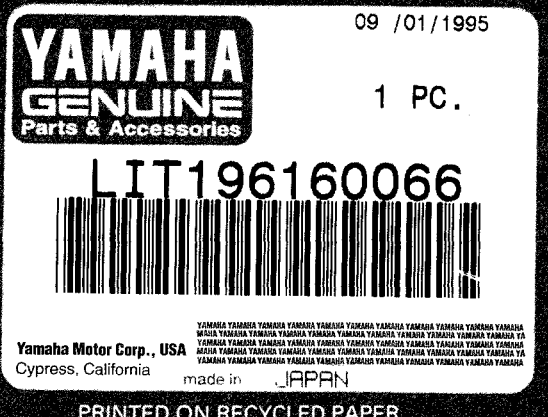
Unit	Read	Definition	Measure
mm cm	Millimeter Centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	Kilogram	10^{3} gram	Weight
N	Newton	1 kg × m/sec^{2}	Force
Nm m•kg	Newton meter Meter kilogram	N × m m × kg	Torque Torque
Pa N/mm	Paskal Newton per millimeter	N/m^{2} N/mm	Pressure Spring rate
L cm^{3}	Liter Cubic centimeter	—	Volume or Capacity
r/min	Rotation per minute	—	Engine speed

HOSE ROUTING

① Carburetor air venthose
② Fuel tank breather hose







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